BUREAU OF HYGIENE AND TROPICAL DISEASES.

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CHOLERA.

LEAGUE OF NATIONS MONTHLY EPIDEMIOLOGICAL REPORT. 1930. June 15. Vol. 9. No. 6. pp. 242–251. With 3 maps & 4 diagrams. [In parallel French & English.] **Cholera in 1929-30.**

This bilingual Report is said to deal with Cholera in 1929–30; but it also contains tables of statistics, some from 1921 to 1930, and others from 1926 to 1930. It is stated that cholera has been confined to Asia since 1922, where it has occurred in endemic or epidemic form, particularly in India, Siam, Indo-China and China. It is further recorded that the Mecca pilgrimage has been free from cholera since 1913 owing to the rigorous measures taken against its introduction and spread.

J. H. Tull Walsh.

GRAHAM (J. D.). Etudes sur le choléra dans l'Inde Britannique en 1929–1930. [**Cholera in British India in 1929-1930.**]—*Bull. Office Internat. d'Hyg. Publique.* 1930. Oct. Vol. 22. No. 10. pp. 1874–1878. With 1 text fig. [3 refs.]

This memoir sums up, as in previous years, the investigations which have been carried on in various provinces of India. Very definite expressions of opinion are put forward by the workers in the United Provinces that each new epidemic is always due to importation of a case of cholera and that endemic foci do not exist there. Examination of stools of individuals belonging to apparently endemic areas have never furnished a single carrier. There is, in fact, no evidence for the existence of chronic carriers. An epidemic takes origin through the instrumentality of a case of cholera, to a less extent of a convalescent from cholera and to a still less extent of an individual in the incubation period of the disease. Non-agglutinating vibrios have nothing to do with epidemic cholera.

Investigators in Bihar and Orissa have taken a different course. An examination of 1,479 samples of stools for carriers gave 36 positive individuals with agglutinating vibrios, all of whom were direct contacts of cholera cases. Agglutinating vibrios were isolated from the stools of 3 persons who had not been in contact with epidemic cholera. As in previous years, an increase in the content of vibrios was found to take place in surface reservoirs during the hot dry months and a certain diminution with the onset of the monsoon. All the agglutinating vibrios and most of the non-agglutinating vibrios resembling the former have given the nitroso-indole reaction.

W. F. Harvey.

(17139) Wt P5/68 1,875 6/31 H & Sp Gp 52 32

FALÇÃO (Edgard de Cerquiera). A cholera asiatica e a emigração japoneza para o Brasil. [**Cholera in Relation to Japanese Emigration to Brazil.**]—*Bol. Oficina Sanitaria Panamericana.* 1930. June. Vol. 9. No. 6. pp. 757–761. [2 refs.]

It has been established that the passage of cholera vibrios by carriers is always temporary, a matter of 2 weeks on the average and in exceptional cases of 7 weeks. The problem here considered is that of the quarantine regulations to be imposed by a cholera-free port in Brazil on emigrants from Japanese ports. The efficiency of the Japanese sanitary arrangements is unquestioned and yet in spite of strict rules requiring repeated faecal examinations of contacts and preventive vaccination on a large scale, carriers have been taken on board and epidemics have arisen on outgoing ships. Although the probabilities of introduction of cases from Japan are small, considering the two months' voyage and the precautions taken, still the author thinks the proposal, to detain individuals proceeding from places where cholera is prevalent and to suspend emigration from an infected port for two months after complete cessation of cases, is justified.

W. F. Harvey.

McDOWALL (R. J. S.). **On the Use of Common Compounds of Carbon in Disease, with Special Reference to Cholera.**—*Edinburgh Med. Jl.* 1930. Aug. Vol. 37. No. 8. pp. 463–482. [51 refs.] [King's College, Univ., London.]

This paper is the Parkin Prize Essay of the Royal College of Physicians of Edinburgh for 1930. After some remarks on the early discovered facts concerning CO_2 the author says that they overshadowed the subsequent use of carbon dioxide as a possible therapeutic agent. To J. S. HALDANE we owe the full appreciation of CO_2 as the great stimulant of respiration. The author fully discusses that question and deals also with the relations of carbon dioxide to the circulation and to the defences of the body. In cholera the importance of the fully functioning vasomotor centre is apparent, since the excessive diarrhoea reduces the amount of fluid in the body and the blood becomes so concentrated and reduced in amount that the blood pressure may fall to a dangerous extent. Evidence has been put forward that not only is recovery of the blood pressure after an injection of histamine due to activity of the vasomotor centre, but that the response is profoundly affected by carbon dioxide. The relationships of CO_2 to adrenaline are considered. The use of carbon dioxide and adrenaline stimulates the sympathetic and inhibits the activity of the bowel. For a similar reason in cholera ROGERS advocates the administration of atropine, another carbon compound, night and morning. The author describes the use of sodium bicarbonate and gum arabic in cholera [see this *Bulletin*, Vol. 14, p. 183 (BAYLISS); Vol. 15, p. 77 (ROGERS, BAYLISS) and p. 78 (MOORE)]. Glucose is also advocated for intravenous injection. Alcohol in reasonable quantities offers a method of supplying energy when the absorptive powers of the individual are low.

J. H. T. W.

TOMB (J. Walker). **The Differential Diagnosis of Cholera and Food Poisoning.**—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. pp. 494–496. [6 refs.]

The author states that fatal cases of cholera among Europeans in India are often attributed to "ptomaine poisoning" notwithstanding the fact that no bacteriologically attested outbreak of food infection has been recorded in India. The term "ptomaine poisoning" is a misnomer and should be discarded. The word *ptomaine*, from *ptoma*, a corpse, was coined in 1870 to describe the products of protein decomposition. Some of these, though by no means all of them, when injected parenterally into laboratory animals were found to be poisonous. Subsequent research showed that none of them were actively poisonous when taken by the mouth, and that even those that were active did not produce intestinal colic, vomiting and diarrhoea. The term "food poisoning" or "food infection" should be substituted. The organisms responsible for "food infection" have been shown to belong to the Salmonella group and include *Bact. enteritidis* (Gaertner) and *Bact. aertrycke*. The differential diagnosis of cholera and food infection is given in tabular form:—

Symptoms.	Cholera.	Food Poisoning.
Diarrhoea ...	Painless. Precedes vomiting.	Associated with severe intestinal pain. Generally follows vomiting.
Vomiting ...	Causes no distress. Watery, copious and projectile. Follows diarrhoea.	Often violent and distressing. Vomit consists of food, and is never watery, copious or projectile. Generally precedes diarrhoea.
Nausea	Absent	Constant.
Retching ...	Rare	Constant, often severe.
Acute abdominal pain	Rare	Constant.
Tenesmus ...	Absent	Common.
Stools	"Rice-watery" and copious.	Liquid but faecal and offensive. Never colourless or copious.
Urine	Complete suppression.	Never suppressed.
Muscular cramps	Constant. The severity depending on the amount of fluid lost from the tissues.	Present only in very severe cases. Often associated with tingling and numbness. Mild and confined to the extremities.
Collapse	Frequent. Chiefly from loss of fluid.	Never from loss of fluid. In severe cases faintness or syncope may occur from toxaemia.
Fever	Surface temperature below normal.	Axillary temperature 99–102°F. Accompanied by shivering in severe cases.
Headache ...	Absent	Frequent.

J. H. T. W.

MUKHERJEE (Suresh Chandra). **Intravenous Calcium Chloride in the Treatment of Cholera.**—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. pp. 498–499. [2 refs.]

Results with different forms of treatment of cholera in the collapse stage by the intravenous method are shown below:—

Period.	Treatment.	Cases.	Deaths.	Percentage of	
				Deaths.	Recoveries.
A. 1927, 1928, and first 2 months of 1929.	Hypertonic saline, $CaCl_2$ gr. 4 to pint.	38	13	34·2	65·8
B. Last 10 months of 1929.	Hypertonic saline, $CaCl_2$ gr. 5 or 6 to pint.	28	5	17·8	82·2
C. First 20 days of 1930 epidemic.	Hypertonic saline, $CaCl_2$ gr. 5 or 6 to pint, with Sod. chloride gr. 105. Also Sod. bicarbonate gr. 160 to the pint separately.	18	4	22·2	77·8

The author considers "C" to be the best treatment for severe cases of cholera.

J. H. T. W.

HERMANT. Mesures de prévention et de suppression des épidémies de choléra. [**Prevention and Suppression of Cholera Epidemics.**]—*Ann. de Méd. et de Pharm. Colon.* 1930. July–Aug.–Sept. Vol. 119. No. 3. pp. 362–377.

The author states that anti-cholera vaccination is not sufficient to protect against epidemics of cholera unaided by a powerful sanitary organization and points out that as yet no such organization has been established in Indo-China. He has drawn up a useful list of measures of prevention and another list of measures for the suppression of cholera epidemics. They contain nothing that is new.

J. H. T. W.

SARRAMON. Sur l'emploi préventif du vaccin anticholérique par voie buccale. [**Oral Administration of Anticholera Vaccine.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Feb. Vol. 8. No. 2. pp. 180–183.

The author is an enthusiastic supporter of the use of bilivaccine as a preventive of cholera. According to his data the villages where this vaccine was used gave an incidence of 0·36 per cent. for 4,982 treated and of 2·02 per cent. for 11,004 not treated. Very similar results were obtained with an inoculated vaccine, namely, 0·37 per cent. incidence for 8,485 treated and 1·67 per cent. for 29,254 not treated. Much the same result was also obtained in villages where the two methods of preventive treatment were employed side by side.

W. F. Harvey.

URBAIN (Achille). Les vaccinations anticholériques. [**Anticholera Vaccination.**]—*Rev. Prat. Malad. des Pays Chauds.* 1930. Sept. Year 9. Vol. 10. No. 9. pp. 397–402, 405. [1 ref.]

In this short review of the subject there is given an account of the evolution of cholera vaccine treatment, the various types of vaccines and those statistics which have been presented by originators and advocates of the different forms of treatment. Beginning with FERRAN and HAFFKINE, who used living vaccine, the author describes the introduction of a killed vaccine by GAMALEIA and recounts the several steps which have led to the sensitized vaccine, the bilivaccine and antivirus, which are associated with the name of BESREDKA. The conclusions of the author are that the best vaccines contain young vibrios and are killed by heat, that orally administered bilivaccine requires confirmation of its value, and that cholera antivirus is still under trial in the laboratory.

W. F. Harvey.

RAJU (V. Govinda). **The Influence of Age and Temperature of Storage on the Strength of Cholera Vaccines.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 527–532. [3 refs.] [Public Health Dept., Bengal.]

Carbolized cholera vaccine undergoes a steady diminution of its opacity from the day of preparation. An experiment carried out at room temperature showed that the average strength of 29 vaccines, as determined by the opacity test, was initially 49,000 millions per cc. and that this opacity strength, determined on the 1st, 2nd, 3rd, 4th, 6th, 14th, 21st and 28th days after preparation, was estimated at 29, 25, 19, 18, 16, 15, 13 and 12 thousand millions respectively. The universal use of the opacity estimation makes this observation a very real argument for standardization immediately after preparation, even when the preparation is on a large scale. Low temperature was found to delay somewhat the autolysis causing loss of opacity, while the action of light seemed to be altogether without any effect in either direction. Exposure to light, however, caused production of a brownish tinge in the vaccine.

W. F. Harvey.

ARNOLD (Lloyd) & SHAPIRO. **An Experimental Study of Host Susceptibility to Cholera.**—*Indian Med. Gaz.* 1930. Sept. Vol. 65. No. 9. pp. 496–498. [4 refs.] [Med. College, Univ. of Illinois, & Research Lab., Illinois Dept. of Public Health, Chicago.]

The object of this paper is to show that, in rabbits, host susceptibility to *V. cholerae* has been changed or modified by changing the reaction of the upper part of the intestinal tract:—

1. *V. cholerae* injected into the duodenum of rabbits in saline does not cause diarrhoea—such animals remain healthy.
2. *V. cholerae* injected into the duodenum in alkaline buffered phosphate solution causes diarrhoea and death.
3. One half of the minimal lethal dose of *V. cholerae* injected intravenously does not cause diarrhoea, nor does it do so if followed by an intraduodenal injection of saline.

4. The same dose intravenously, followed by intraduodenal injection of sterile alkaline buffered phosphate solution, causes diarrhoea and death. In 2 and 4 vibrios can be isolated from the intestinal tract and various organs after death.

J. H. T. W.

WATANABE (Yoshimasa). **The Type Determination of** *Vibrio cholerae.*—*Japan Med. World.* 1929. Dec. 15. Vol. 9. No. 12. pp. 367-374. [26 refs.] [Kitasato Inst. for Infect. Diseases, Tokyo.]

This article treats of the different types of cholera vibrio which have been isolated in Japan and of their title to be designated true cholera vibrios. The types receive the names of typical, atypical and intermediate, or are divided up numerically. In general epidemics the typical vibrio is usually the one obtained whilst atypical vibrios are isolated from sporadic cases. Controversy in Japan has proceeded on lines similar to that elsewhere. It is the controversy over the cholera and the cholera-like vibrios. Cholera is imported into Japan mainly from China and especially Shanghai.

W. F. Harvey.

DHAR (D. R.), DHAR (Hrishikesh) & ADHYEE (Purna Chandra). **The Rôle of Non-Protein Nitrogen Content of Blood in Cases of Cholera.**—*Calcutta Med. Jl.* 1930. July. Vol. 25. No. 1. pp. 1–10. [1 ref.]

In order to find out what relation post-choleraic uraemia had with the pathogenesis of cholera the non-protein nitrogen content of the blood was estimated in 66 cases of cholera picked out at random from several hundred cases in the wards. They showed a definite rise of N.P.N. in their blood and the incidence of post-choleraic uraemia symptoms was such a common experience that the authors conclude that every case of cholera is one of potential uraemia. Their experience has caused them to modify their treatment of cholera on a line in which free purgation is allowed to the last, either with Hydrarg. Subchlor., Castor oil or concentrated solutions of Mag. Sulph. and Sodii Sulph. The details of these methods and their results will form the subject of a subsequent paper.

J. H. T. W.

KHAN (Saranjam). **On the Vibriocidal Power of the Water of Certain Rivers of India.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 361–365. [4 refs.]

Since the time of HANKIN's experiments (1896) it has been known, and confirmed by various workers, that *V. cholerae* dies rapidly in river water. Khan & AGARWAL found that in the Ganges and the Jumna river water the vibrio died out in almost 24 hours. In the same water, boiled, it lived on the average for about 3 days. It was thought desirable to investigate the cause of the vibriocidal power of the water of these rivers. If it be true in nature, as it may be in the laboratory, that waters which contain bacteriophage are inimical to the cholera vibrio (as was suggested by D'HERELLE) the fact is of practical importance. As the result of experiments the author found

that the water contained no bacteriophage nor could any vibriocidal substance be volatilized from the water. In raw water there are many organisms competing for food. By heating the water for half an hour at 55° C. most of these organisms are killed and *V. cholerae*, therefore, lives for much longer in the heated water.

J. H. T. W.

i. TOHYAMA (Yuzo) & YASUKAWA (Yutaka). **Experimental Results on the Viability of** *Vibrio Metschnikoffi* **(Substitute for** *Vibrio cholerae*) **in the Sea of Yokohama Harbour.**—*Japan. Jl. Experim. Med.* June 20. Vol. 8. No. 3. pp. 227–271. With 17 text figs. & 5 figs. & 1 plan on 3 plates. [8 refs.]

ii. YASUKAWA (Yutaka). **Experiment on the Sterilization of Sea Water by Chlorine. (At Yokohama Harbour.)**—*Ibid.* pp. 273–283. [6 refs.]

i. In Japan cholera is invariably introduced from outside and makes its first appearance usually on the sea coast. The consumption of fish in Japan is on a large scale and the relation of fish to cholera is a question of great interest to Japanese. In this investigation *V. metchnikovi* was used in place of actual *V. cholerae*, and the experiments were carried out with sea water in the actual harbour of Yokohama. It was found that the viability of the vibrio varied according to the season and places examined, being longer in summer and shorter in winter, with a range from 9 days in August to 2 days in February.

ii. This article is concerned with the disinfecting properties of chlorine for the *Vibrio cholerae* when added to sea water in the form of a suspension of bleaching powder. The procedure is not considered effective for a harbour but may be so in the case of small rivers.

W. F. Harvey.

TETSUMOTO (S.). **Numerical Variation and Surviving Period of** *Vibrio cholerae* **placed on Aquatic Food Preparations.**—*Japan. Jl. Experim. Med.* 1930. Aug. 20. Vol. 8. No. 4. pp. 353–363. [Govt. Inst. for Infectious Diseases, Imperial Univ., Tokyo.]

In Japan fish of all sorts is very largely eaten and this not so much in the fresh form as salted or tinned or otherwise prepared. This investigation included both the duration of survival and the question of actual increase of *V. cholerae* when planted out on these various preparations. No increase could be detected on salted fish, such as occurs on fresh fish. There was, however, a difference in the survival period, which was greater for the epidermis than for the flesh of fish. In the case of sterile tinned food preparations, the results varied according to the food material used in culture. A gradual increase is reported as occurring on salmon and sea-ear. On other preparations a survival for a longer time than usual was noted or a rapid decrease.

W. F. Harvey.

GAUTIER (R.). **Epidemiological Study of Cholera in Shanghai.**—*Nat. Med. Jl. China.* 1930. Oct. Vol. 16. No. 5. pp. 595–606. [League of Nations Health Organisation, Eastern Bureau, Singapore.]

This is an interesting paper dealing with cholera generally and the particular conditions which exist in Shanghai. It contains nothing new.

J. H. T. W.

ESSED (W. F. R.). De aetiologie der pseudocholera.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Feb. 1. Vol. 70. No. 2. pp. 147–164. [44 refs.]

LABERNADIE (V.) & NARAYANIN (C.). Note sur l'épidémiologie du choléra à Pondichéry.—*Ann. de Méd. et de Pharm. Colon.* 1930. July–Aug.–Sept. Vol. 119. No. 3. pp. 442–444.

RAJU (Rao Bahadur V. Govinda) & SIRCAR (B. L.). Results of Inoculation of Cholera Vaccine in Nabadwip (Bengal).—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 564–565.

SINHA (H. K.). Observations on the Choleroid Epidemic at Lucknow (India), 1921.—*Jl. Trop. Med. & Hyg.* 1930. Dec. 15. Vol. 33. No. 24. pp. 389–391. With 5 figs. [King George's Med. College, United Provinces, Lucknow.]

YAWS AND SYPHILIS.

VAN NITSEN (R.), LEJEUNE (E.), MIGUENS, SERRA (G.) & VAN DEN BRANDEN (F.). Le pian et la syphilis seraient-ils une seule et même affection? [**Are Yaws and Syphilis One Disease?**]—*Bruxelles-Méd.* 1930. Nov. 30. Vol. 11. No. 5. pp. 118–127.

An interesting article containing the replies from the authors to a questionary sent to them by the *Bruxelles-Médical.* The several replies cover much the same ground and do not really bring forth any new evidence upon the unity or duality of the two diseases, but the evidence to all these medical men, whose observations have been made in Central Africa, is in favour of there being two disease entities. Some of the points of differentiation upon which stress is laid are the following: The fact that the two diseases, where they occur side by side, are never mistaken by the native: the characteristics of the initial lesion are different: the evolution of each disease has its own period: inoculated syphilis always produces syphilis, inoculated yaws always yaws: the two diseases may co-exist: the one does not confer an immunity to the other (though in monkeys there may be a partial immunity which may be looked upon as a group reaction): yaws is not inherited, it does not produce abortion and visceral manifestations are rare if ever seen. In regard to those lesions in yaws which might be confounded with syphilitic manifestations van Nitsen believes that with care in practically all cases the trained medical man can make a sure diagnosis. [Some observers refer to the therapeutic test with mercury but it would appear they are merely quoting what was written long ago and has been copied ever since without putting the matter to further test. The same is true of some of the observations made by earlier experimenters—many of these need confirmation. Recent work on immunity has shown how complicated the problem may be and many statements made in the past regarding yaws and syphilis need reconsidering. None of the authors of this symposium on yaws mentions the pathological findings in the two diseases.]

Van Nitsen in his conclusion says of the "unitarians" that though their theories are seductive they are based on the hypothesis of treponema tropisms and remain therefore theories.

H. S. Stannus.

BUTLER (C. S.). **Diagnosis and Treatment of Yaws.**—Reprinted from *Internat. Clinics.* 1930. Ser. 40. Vol. 2. 14 pp. With 18 figs. (1 coloured) on 8 plates. [15 refs.]

Surgeon Captain Butler is, as is well known, one of the protagonists of the theory that yaws and syphilis are one and the same disease. In the present paper, which contains nothing new, he enunciates his "articles of faith." It is there for all those who have studied these diseases to read and find out whether they subscribe to his opinions or not. The word "studied" is used advisedly as the reader must be in a position to criticize statements which are made as statements of facts. Only one allusion will here be made. Below the frontispiece the following subscription appears:—"A framboesial face showing a secondary eruption of three months' duration in a Java child aged twelve years. This is what is called for by the text-books in their

definition of yaws, but is rarely seen in practice." The reviewer, while taking no part in the discussion, would like to assure Captain Butler that such cases are common enough where yaws is endemic and at the same time would ask him if he can counterpart the condition from a country where there is no yaws, in other words by a case of syphilis.

H. S. S.

O'Reilly (B. C. N.). **Differentiation between Yaws and Syphilis.**—*California & Western Med.* 1930. Dec. Vol. 33. No. 6. pp. 881–883.

A short paper read at Elko, Nevada, to draw attention to the possibility of yaws being introduced into California, a possibility not entertained by some of those taking part in the discussion. The paper contains nothing new in regard to yaws and some statements made tend to give false impressions. Africa with its hundreds of thousands of cases of yaws is not mentioned under geographical distribution. "Until comparatively recent times this disease was described only in books on skin diseases" can hardly be accepted. "The primary stage is manifested by a soft papule, soon becoming a painful ulcer" is a poor and, it is believed, incorrect description of this lesion.

Apropos of syphilis and yaws in the same person, the author states—"I have had out-patients (Gilbert Islands) suffering from yaws develop a chancre in the days before salvarsan was used as a treatment for yaws, this proving the separate identity of the two diseases." The author apparently believes that yaws attacks the lungs. 400 men were medically examined in Gilbert Islands prior to shipments to work with a phosphate company. Within a year 10 were repatriated labelled pulmonary tuberculosis—the symptoms being little cough, no fever, slight loss of weight, sputum negative for tubercle bacilli. Treatment with neosalvarsan immediately stopped all symptoms [It is suggested that the evidence in favour of the symptoms being due to framboesia is certainly sketchy.]

H. S. S.

Miguens (J.). Le traitement actuel du pian. [**Present Treatment of Yaws.**]—*Bull. Méd. du Katanga.* 1930. Vol. 7. No. 3. pp. 65–75. [14 refs.]

Miguens again discusses the value of various drugs in the treatment of yaws [see this *Bulletin*, Vol. 27, p. 715] and finds in an oily suspension of dermatol injected intramuscularly the preparation having the greatest advantages. The dose of such a 10 per cent. preparation is in the proportion of 1 cc. per 10 kilogram weight given at 4-day intervals. While a single injection is often followed by clinical cure, a series is better given with a total of 1·5 gm. of the metal. Stovarsol by mouth also gives excellent results. For children 3 tablets each of 0·25 gm. on each of two consecutive days are given and proportionately larger doses for adults.

H. S. S.

CHESNEAU (Pierre). Le pian au Cammon, province du Moyen-Laos. [**Yaws in Cammon, Middle Laos.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. Feb. Vol. 8. No. 2. pp. 133–160. With 1 folding map.

Yaws was studied in Laos in 1925 by FRANCIÈRE, who commenced the anti-yaws campaign, subsequently further organized by GUILLAUME in 1926 and now carried on by the present author. He deals with the geographical distribution of the disease in the province of Cammon, which lies between Vientiane and Savannakhet, Annam and Siam. The population is chiefly Indo-Malay and Mongol; neither shows any particular immunity to yaws. The incidence of yaws depends chiefly on density of population and ease of geographical communication; the greater the incidence the larger the proportion of children with initial infections; males are more commonly affected than females. Clinically the disease resembles that met with elsewhere. Phagedenic ulceration as a complication of framboesial lesions is not so common among the Laotians as among the Annamites. 94 cases (59 men, 35 women) of juxta-articular nodules were noted; in 19 there was no history or other evidence of previous yaws. All were above the age of 20. Besides the ordinary sites, in 3 cases the nodes were situated on the forehead, in 2 on the superciliary ridges, and in 3 in the neck.

Treatment by stovarsol was at first used but later, on account of greater cheapness, salicylate of bismuth was substituted.

H. S. S.

SMITH (E. C.). **Some Dermal Manifestations of Yaws.**—*West African Med. Jl.* Lagos. 1930. July. Vol. 4. No. 1. pp. 9–11. With 24 figs. on 6 plates. [6 refs.] [Med. Research Inst., Lagos.]

Dr. Smith, writing from Lagos, cites some of the less commonly described [perhaps less commonly recognized] framboesial skin lesions which he has observed in Nigeria. He speaks of them as "atypical sequelae" [perhaps not a strictly true interpretation] and says "reinfection seems to play an important part in the production of these altered types of dermal reaction" [without giving evidence that reinfection has occurred].

Among the earlier lesions he describes the larger depigmented patches and smaller circular areas of skin with slight roughening or powdery exfoliation and similar hyperpigmented areas, both confined to sites of original eruption. The latter histologically show increase in the horny layer with irregular acanthosis. The corium is infiltrated with inflammatory cells, plasma cells predominating and large elongated spindle-shaped rounded or stellar cells loaded with pigment are characteristic; the deeper vessels show perivascular infiltration. Thirdly are mentioned the rounded or oval patches of papular keratosis looking like goose-flesh or lichen with a histological picture of slight generalized hyperkeratosis involving also hair follicles and sweat gland ducts with mild perivascular inflammation. Serpiginous and ringworm varieties of eruption are also mentioned. Among the later manifestations are given (1) mottled depigmentation of hands and lower extremities [originally described by ZIEMANN], (2) markedly hyperpigmented circular or larger irregular, raised areas on the lower limbs with a

rough surface "suggestive of crushed cinders," (3) eczematous and icthyotic changes in the palms of the hands, (4) keratoderma with cribriform, pin-point pitting or irregular erosions of the thickened horny layer and histologically the marked thickening, hyalinization, parakeratosis and chronic inflammatory exudate, plasma cells and lymphocytes, in the corium, (5) ulcerative lesions which do not show the vascular changes characteristic of syphilis, (6) gangosa.

[These lesions are now probably well recognized in all yaws countries but the descriptions are good and the photographs excellent.]

H. S. S.

CHESTERMAN (Clement C.). **Melanoma following "Crab-Yaws."**—*Lancet.* 1931. Jan. 24. pp. 183–184. [3 refs.]

At Yakusu in Belgian Congo among 40,000 native sick seen in 10 years, 8 cases of malignant disease were diagnosed, and of these 3 were cases to which the name of melanoma was given, three males, ages 35, 45 and 45, with growths on the soles of the feet at the site of old crab-yaws and enlarged crural glands. The tumours were respectively the size of a golf ball, a tangerine orange and a cricket ball. In the second case the glands broke down and a black discharge issued from the sinuses, the patient subsequently dying with secondary deposits in lungs and liver. In the third case the glands were removed. The clinical diagnosis was supported by a pathological report in the first case—"melanotic sarcoma of low malignancy with a considerable degree of fibrosis." Dr. Chesterman then says, "yaws must be regarded . . . as a potential carcinogenic agent" and thinks that the native practice of holding the part affected with crab-yaws in the hot smoky flame produced by burning powdered resin, may be another factor, "bearing in mind the well-known carcinogenic properties of soot, tar, etc."

[In view of the great difficulty in interpreting the histological picture in melanoma and the interest the problem offers, one may hope that Dr. Chesterman's specimens will be very carefully reported on. The occurrence of melanomas following trauma has been recognized and they have been noted as specially frequent on the soles of the feet at all ages. For an interesting discussion on The Problems of Melanoma see paper by Prof. James EWING, *Brit. Med. Jl.*, 1930, Nov. 22, p. 852.]

H. S. S.

AARS (Ch. G.). Corymbiforme exantheemvormen bij syphilis en framboesia. [**Corymbiform Eruption in Syphilis and Yaws.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Nov. 1. Vol. 70. No. 11. pp. 1096–1100. With 4 plates. [3 refs.] [Milit. Hosp., Paramaribo.]

The author saw in Surinam (Dutch Guiana) two cases of corymbiform yaws and one of corymbiform syphilis; these three cases are described. A corymbiform exanthem is a rare manifestation of yaws in Surinam; in the two cases described it was accompanied by papulo-miliary lesions. If lesions resembling *lichen spinulosis* (as in these two cases) should prove to be common in cases exhibiting a corymbiform eruption it might serve as a useful diagnostic feature from syphilis.

W. J. Bais.

KAISER (L.). De framboesia-bestrijding in Mandar (Celebes) van 1925–1929. [**Combating of Yaws in Mandar (Celebes), 1925–1929.**] —*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. June 1. Vol. 70. No. 6. pp. 574–575.

The author administered neosalvarsan injections in increasing numbers from 5,736 in 1925 to 22,789 in 1928, but did not succeed in stamping out yaws in the district. The efficacy of the injections was marked enough and the author discusses the epidemiological influences which cause the endemic to persist. He considers plantar and palmar affections as well as crusts, dropping from the healing lesions, as so many sources of infection. Accordingly he initiated propaganda to ensure cleanliness, especially the use of soap and water, among his native patients and asserts that success followed these measures, only 17,237 injections being necessary in 1929.

W. J. Bais.

i. SCHÖBL (Otto), TANABE (Bunshiro) & MIYAO (Isao). **Preventive Immunization against Treponematous Infections and Experiments which indicate the Possibility of Antitreponematous Immunization.** —*Philippine Jl. Sci.* 1930. June. Vol. 42. No. 2. pp. 219–237. [8 refs.]

ii. —— & GARCIA (Onofre). **Serologic Reciprocity between Yaws and Syphilis.**—*Ibid.* pp. 203–217. With 8 figs. (4 folding). [3 refs.]

iii. ——. **Experimental Study of Immunologic Reciprocity between Yaws and Syphilis, considering also other Phases of Immunity besides the Complete Resistance to Infection.**—*Ibid.* pp. 239–250. [5 refs.]

The following conclusions are given by the authors :—

i. "We have in these experiments indicated a procedure, unique of its kind, in treponematous diseases and unsurpassed in preventive immunization of any disease, whereby through the use of killed and harmless vaccine an immunity of long duration may be induced in experimental animals more rapidly than by the most severe infection."

"1. Specific treatment with neosalvarsan given after tests for immunity by inoculation has no effect on the immunity produced by yaws vaccination.

"2. Immunity to yaws produced by yaws vaccination prevents the development of a specific syphilitic lesion, but does not necessarily prevent the penetration of treponemas of syphilis into the regional lymph glands corresponding to the point of inoculation with syphilis."

ii. "1. The behaviour of serologic reactions as a consequence of superinoculation in treponematoses points to sensitization as the underlying principle. An early serologic response and a late one are frequently detectable in animals singly inoculated with treponemas. The early response is coincident with the primary treponematous lesion and is an indication of strong sensitization of the animal's tissues ; the late one is coincident with the full development of immunity and indicates the time when a lesion will no longer develop upon superinoculation.

"2. Superinoculation, performed on infected or vaccinated animals, increases and accelerates the late serologic response. This indicates that similar conditions may exist with regard to immunity to treponematoses.

"3. Serologic reciprocity between yaws and syphilis exists. The serologic effect of cross-superinfection follows the same laws that govern the serologic effect of superinfection with homologous treponemas.

"4. The serologic reactivity of a given experimental animal is directly proportionate to the tissue reactivity of that animal towards the particular kind of treponemas; in other words, it stands in direct proportion to the number of invading parasites."

iii. "1. Yaws-infected monkeys are susceptible to cutaneous infection with syphilis during the early stage of yaws during which they are susceptible to yaws.

"2. Superinfection with syphilis of yaws-infected monkeys hastens the onset of immunity to yaws.

"3. This phenomenon brings further proof of immunologic relationship between yaws and syphilis and shows that the biologic difference between treponema framboesiae and treponema luis is one of organotropism, or tissue selectivity."

"1. There exists an immunologic relationship between yaws and syphilis with regard to the negative phase which is responsible for the occurrence of exacerbations and relapses in treponematoses.

"2. The immunity following yaws vaccination in some instances is not as firmly established as the immunity following yaws infection with clinical manifestations.

"3. Treponemas of yaws may survive for a considerable time in the skin of immunes to yaws, without producing a lesion."

H. S. S.

SCHÖBL (Otto). **Further Experiments concerning Immunologic Reciprocity between Yaws and Syphilis.**—*Philippine Jl. Sci.* 1930. Oct. Vol. 43. No. 2. pp. 263–264. [1 ref.]

"Eleven Philippine monkeys that had gone through yaws infection and were proven to be immune to yaws were inoculated with syphilis by intradermal injection on the scrotum. Two normal control animals were included in the test for immunity to syphilis. The shortest interval of time between the first inoculation with yaws and the test for immunity to syphilis was twelve months, the longest twenty-one months. Following the inoculation with syphilis the places of inoculation were inspected regularly for a period of five months. At various intervals of time the inguinal lymph glands corresponding to the point of inoculation with syphilis on the scrotum were removed aseptically and transplanted to the testicles of normal rabbits. The rabbits were inspected weekly for a period of five months and the results were noted. The details are evident from Table 1.

"None of the yaws-immune monkeys developed lesions at the places of inoculations with syphilis and none of them harbored viable treponema luis in the lymph glands corresponding to the places of inoculations with syphilis. All normal control monkeys developed typical syphilitic lesions and harbored viable treponema luis in the lymph glands corresponding to the places of inoculation with syphilis." [See also this *Bulletin*, Vol. 27, p. 717.]

H. S. S.

i. SCHÖBL (Otto). **Immunologic Reciprocity between Syphilis and Yaws.**—*Philippine Jl. Sci.* 1930. Dec. Vol. 43. No. 4. pp. 583–588.

ii. ——. **The Immunologic Effect of Repeated Yaws Infections interrupted by Specific Treatment given in the Early Stage of Initial Yaw.**—*Ibid.* pp. 589–594. [4 refs.]

iii. ——. **The Duration of Antitreponematous Immunity with Regard to Syphilis in Philippine Monkeys.**—*Ibid.* pp. 595–598.

iv. SCHÖBL (Otto). **The Duration of Antitreponematous Immunity in Philippine Monkeys originally conveyed by Immunization with Killed Yaws Vaccine.**—*Ibid.* pp. 599–601. [6 refs.]

v. ——. **The Immunologic Effect of Antitreponematous Vaccine Therapy administered after Specific Treatment which was given in the Early Stage of Initial Local Yaws in Philippine Monkeys.**—*Ibid.* pp. 603–609. With 1 text fig. [6 refs.]

Schöbl in five short communications publishes the results of further experimental investigations into yaws ; his conclusions are as follows :—

i. "1. Immunologic reciprocity exists, not only between yaws and syphilis but also between syphilis and yaws.

"2. Syphilis in Philippine monkeys produces immunity to itself much sooner than it does to yaws and sooner than yaws does to itself.

"3. Superinoculation with syphilis of syphilitic monkeys performed in the stage of tissue nonreactivity does not hasten the immunity to yaws.

"4. Superinoculation of syphilitic monkeys with yaws, performed at a time when they have reached the stage of nonreactivity to syphilis but still react by formation of typical yaws to inoculation with yaws, does not hasten the immunity to yaws within the period tested.

"5. The immunologic reciprocity between yaws and syphilis is group immunity. One of the two immunizes against itself quicker than against the other."

ii. "1. Repeated local yaws infections terminated by specific treatment given before the time when generalized yaws manifestations occur produce immunity in Philippine monkeys, even though delayed.

"2. The incubation period becomes irregular, mostly prolonged with the repeated reinoculations terminated by treatments. This shows that the developing immunity, although not yet strong enough to suppress completely the development of lesion, has a definite effect upon the incubation period. This observation strengthens our claim that sensitization is the underlying principle of immunity in treponematoses.

"3. The findings made on monkeys corroborate and amplify the findings previously made on human volunteers and prove that immunization against yaws by means of repeated local yaws infections terminated by treatments is possible.

"4. Jointly with our previous experimental evidence these results indicate that the most favorable time for immunization in treponematoses is the early stage of infection and that it must be carried out vigorously within the first few months of infection or immunization."

iii. "If it is considered that the immunity to syphilis in Philippine monkeys sets in about one and one-half months after the inoculation with syphilis and in about eight months after inoculation with yaws, the persistence of immunity to syphilis in Philippine monkeys is clearly evident. There is every reason to believe that immunity to syphilis, like immunity to yaws, lasts throughout the natural life of these animals."

iv. "Antitreponematous immunity in vaccinated monkeys that have been proven immune to skin inoculation with yaws and syphilis is of as long duration as the immunity induced by infection accompanied by specific skin lesion."

v. "1. Vaccine therapy with killed syphilis vaccine performed on yaws-infected and early treated monkeys accelerates the onset of immunity to yaws.

"2. The immunity to yaws as a consequence of syphilis vaccine treatment administered to early cured yaws monkeys develops earlier than it does in early cured non-vaccinated yaws monkeys and earlier than it develops in untreated yaws monkeys with local yaws only.

"3. The immunity under the conditions of vaccine treatment just mentioned, develops as early after the vaccination as it does in yaws-infected untreated monkeys after the generalization of the yaws process.

"4. These findings are further proof of immunologic reciprocity between yaws and syphilis and corroborate our previous findings that superinfection with syphilis of yaws-infected monkeys accelerates immunity to yaws.

"5. This experiment proves our contention deduced from former experiments that vaccination administered early to recently sensitized animals has the same immunologic effect as generalization of the treponematous process. It confirms our former findings concerning vaccination in treponematoses."

H. S. S.

i. MIYAO (Isao). **An Inquiry into the So-called Latent Infection in Yaws-Vaccinated Monkeys as a Possible Result of the Test for Immunity by Intradermal Inoculation with Living Yaws Material.** —*Philippine Jl. Sci.* 1930. Nov. Vol. 43. No. 3. pp. 425–428. [5 refs.]

ii. ——. **Immunologic Relation between Three Philippine Strains of Yaws.**—*Ibid.* pp. 429–432. [8 refs.]

iii. ——. **Is Framboesia Tropica a Nosologic Entity ?**—*Ibid.* pp. 433–449. [18 refs.]

i. The wording of this article makes it rather difficult to read, as shown in the two opening paragraphs quoted below :—

"The theory that latent infection is the cause of resistance and not the consequence of immunity in treponematoses is still found in the literature. Therefore, one of the objections to the interpretation of the findings made in the test for immunity in yaws-vaccinated monkeys was the possibility that following the first infection, as a test for immunity, a latent infection developed in vaccinated and immune animals. However, the development of the resistance to inoculation in yaws-vaccinated monkeys was too sudden to be due to the infection as a test for immunity, and the resistance was found constantly in all vaccinated monkeys that were inoculated later than six weeks after the vaccination began.

"Nevertheless, it was deemed advisable to make an experimental inquiry into the possibility of latent infection in such animals, particularly in view of the great stress that is laid on this condition in experimental syphilis as an explanation of resistance to inoculation."

Monkeys previously inoculated with a killed yaws vaccine did not develop a lesion when subsequently inoculated on the scrotum with a living yaws virus. The point at issue was, were they really immune or did they develop with the second inoculation a latent infection ? An emulsion of the groin glands was made and examined by dark field illumination and also by injection into clean animals. The results were negative and prove, it is held, that no latent infection occurred.

ii. The author's conclusions are summed up in his own words :—

"The tabulated results of our experiments show that immunologic reciprocity between heterologous strains of yaws exists. The time necessary for the development of immunity produced by infection with one strain of yaws towards another strain may vary somewhat ; particularly if the immunizing strain produces feeble and short-lived lesions, the development of cross immunity may be delayed, as was the case with the Katayama strain."

iii. In this paper which was presented as a thesis for the degree of " Hakushi " in Medicine the author discusses the points of difference between yaws and syphilis from clinical, distributional, immunological, chemotherapeutical and pathological points of view, and comes to the conclusion that the two diseases belong to one group and show close relationship, but are fundamentally distinct.

H. S. S.

KAKISHITA (M.). Beiträge zur experimentellen Frambösie. [**Experimental Yaws.**]—*Zent. f. Bakt.* I. Abt. Orig. 1930. Dec. 22. Vol. 119. No. 3/4. pp. 212–217. [10 refs.] [Bact. Inst., Med. Faculty, Kanazawa, Japan.]

The following is a summary of the results obtained in rabbits and guineapigs experimentally infected with yaws. Intratesticular inoculation in rabbits was successful in 19 out of a total of 31 ; scrotal inoculation gave 5 positive results out of 21. The incubation period was from 12 to 59 days with an average of 28. During the 2 years which have elapsed since inoculation no metastatic lesions have occurred in rabbits inoculated in the genitals. Successfully inoculated animals showed positive W.R. and M.T.R. The positive reactions lasted longer than the clinical signs. Subinoculation in guineapigs has been carried through 5 passages. Of the various sites used for genital inoculation, the prepuce is the best. Subinoculation from guineapigs to rabbits has been carried out. Subinoculation into a rabbit of tissue from the site of an inoculation done in an ape 450 days previously was successful with recovery of spirochaetes. It is impossible to differentiate the granular periorchitis produced in rabbits from the lesion following syphilitic inoculation. Cross inoculatory tests are not satisfactory since the results are not uniform. The scaly lesions obtained in guineapigs are worthy of note but it is not certain whether any generalization is possible.

H. S. S.

HASSELMANN (C. M.). Frambösie und Syphilis. [**Yaws and Syphilis.**]—Reprinted from *Zent. f. Haut- u. Geschlechtskrankheiten.* Vol. 33. No. 5/6. pp. 273–299. [2 pages of refs.]

An article dealing with yaws and its relation with syphilis from the point of view of what has been written on the subject during the past few years. It might in fact almost be a résumé of the summaries which have appeared in this *Bulletin.*

H. S. S.

SARGENT (Willard S.). **A Case of Deformity due to Yaws.**—*Milit. Surgeon.* 1931. Feb. Vol. 68. No. 2. pp. 179–182. With 1 fig.

The report of a case in which the author believes contractures of muscles causing flexion at hips and knees were due to nerve lesions.

H. S. S.

SHATTUCK (George C.) & GOODNER (Kenneth). **Preliminary Communication on Treponematosis in Yucatan.**—*Amer. Jl. Trop. Med.* 1930. May. Vol. 10. No. 3. pp. 177–182. [6 refs.]

A short paper by members of the Yucatan Medical Expedition of 1929 giving the results of their search for syphilis and yaws among

two groups of people, (*a*) the Maya Indians, who it is believed are essentially a pure stock descended from the inhabitants who lived in this region at the time of the Spanish Conquest, (*b*) Yucatecans or people of mixed Indian and Spanish origin. No case of yaws was seen in either group, and no case of syphilis among the Mayas. Kahn tests done among 150 Mayas gave 3 doubtful and one positive result ; the subject giving the positive result was almost certainly a man of mixed blood and not a pure Maya. Among 121 Yucatecans there were 10 positives and 4 doubtful reactions.

H. S. S.

MIYAO (Isao). **Note on the Viability of Treponema luis.**—*Philippine Jl. Sci.* 1930. June. Vol. 42. No. 2. pp. 199–201. [3 refs.]

Using a rabbit testicle tissue suspension of Nichols' strain of syphilis, intratesticular inoculations were made into normal rabbits, after intervals varying from 30 minutes to 24 hours at 28·5° C., the result being positive in every case (18), thus agreeing with the findings of LACY and HAYTHORN 1921).

Two other experiments showed that virulence may be retained for at least 4 hours at 37° C. and at 0° C. The treponema of syphilis is therefore more resistent to adverse conditions than that of yaws, which according to YASUYAMA only survived at 28·5° C. and 37° C. for 2 hours and died at 0° C. in less than 15 minutes.

H. S. S.

SELLEI (Josef). *Tumor fibrosus syphiliticus.* Ueber die sogenannte juxtaarticuläre Knotenbildung bei Syphilitikern. [**The So-Called Juxta-Articular Nodules in Syphilitics.**]—*Arch. f. Dermat. u. Syph.* 1930. Oct. 22. Vol. 162. No. 1. pp. 176–179. [9 refs.] [Charité Polyclinic, Budapest.]

The author describes under the designation of Tumor fibrosus syphiliticus two cases of juxta-articular nodular formations in patients seen in Budapest.

The first, a woman 37 years old who for 8 years had had 3 nodes about the right knee, two the size of hazel nuts, the third as large as a walnut. She had no other signs or symptoms, the joint was normal, no glandular enlargement but the W.R. was triple positive and the husband had been treated for syphilis. The nodes were sharply defined, subcutaneous, hard, fibrous and painless, the skin over them being moveable and slightly pigmented. Salvarsan and mercury had no effect but with potassium iodide there was some diminution in size. The second case was a male with 2 similar nodes on the ulnar border left arm. W.R. +++ : anti-syphilitic treatment caused slow retrogression.

These two cases resemble exactly the four cases originally described by Sellei in 1918 and he points out that he has priority in having described cases of this condition which subsequently have been commonly referred to as J.A.N. with a syphilitic etiology. The four cases originally recorded by Sellei were Bosnian soldiers sent on to the dermatological clinic of the Garrison Hospital, Budapest. The first had a tumour the size of an egg over the left trochanter, the second a mass the size of a child's fist over the left ankle, the third a node the size of a duck's egg about the right ankle, and the fourth presented a swelling the size of a child's fist over both trochanters. Though there were no obvious manifestations of syphilis three of the four had positive

W.R. None had been abroad. The histological picture is that of a granuloma showing few cells but marked connective tissue proliferation and but little blood-vessel formation, and there was little reaction to anti-syphilitic treatment. The facts are against their being really gummatous in nature. Sellei believes therefore that they are rather of the nature of allergic tissue reactions, and that similar formations occur in other diseases, yaws, leprosy, rheumatism, etc., including conditions which have been called sarkoid and which he regards as an allergic reaction in tuberculosis.

He suggests the descriptive terms Tumor fibrosus syphiliticus, Tumor fibrosus framboesicus, tuberculoticus, etc.

H. S. S.

DELANOË (P.). Un cas de nodosités juxta-articulaires sensibles au traitement antisyphilitique. [**Case of J.A.N. Susceptible to Anti-Syphilitic Treatment.**]—*Arch. Inst. Pasteur d'Algérie.* 1929. June. Vol. 7. No. 2. pp. 202–203. [1 ref.]

The author puts on record a case of J.A.N. similar to that described by M. PICOUT-LAFOREST [this *Bulletin*, Vol. 21, p. 13] in a native of the Sahara in which the syphilitic etiology was proved.

In the present case a woman of 35 years, a native of Morocco, presented a multilobulated node at each elbow " the size of a nut " and of the hardness of cartilage, freely moveable. In the front of each knee about an inch above the patella there was a mass which suggested fatty tissue, the right containing a harder mass within it the size of a nut. The body was covered by a papular syphilide. 0·3 gm. N.A.B. was given intravenously and 12 gm. pot. iodide taken by mouth. Seen two years later all symptoms, which disappeared soon after treatment, had remained absent.

H. S. S.

MOUQUET (A.). Présentation d'un squelette de Cercocèbe atteint de " goundou des singes." [**A Cercocebus Skeleton affected with Goundou.**]—*Bull. Soc. Path. Exot.* 1930. May 14. Vol. 23. No. 5. pp. 478–482. [1 ref.]

The monkey (*Cercocebus aethiops*), the skeleton of which forms the subject of this brief communication, was shown at a meeting of the Society on December 11th, 1929. The author examines the facts now available in an attempt to decide whether the " goundou of monkeys " is of the nature of osteomalacia, whether it is the same condition as met with in man, whether it is a disease of captivity.

The skull is composed of spongy bone and the bones of the face are porous and of the consistence of rusk, while some of the long bones are softened and can be bent with pressure. The humeri show marked thinning of the compact bone with increase in spongy tissue, the cavity being filled with a pathological marrow. The other long bones of the limbs show similar changes, the vertebral column, ribs and pelvis being also affected—a general demineralization with sponginess of the whole skeleton, softening of long bones and tumefaction of the bones of the face, lesions characteristic of osteomalacia and osteoporosis in man and animals. In animals the affection of the bones of the head is often very marked, as seen in pigs, goats and horses. Mouquet believes that the condition has never been demonstrated in animals in the wild state and points out that there is evidence that certain osteopathies of this type are contagious and perhaps inoculable ; they may be cage infections and in this connexion it is worthy of note that the female cage companion of the dead monkey had a small paranasal swelling.

The possibility of this infective process playing a part in the etiology does not put out of court some food deficiency being also involved. On the other hand, that this disease of monkeys and goundou in man are probably of framboesial origin does not seem to receive support.

MESNIL, discussing the communication, believes that the two diseases are one and the same on clinical and histological grounds, adding that both conditions are only met with in man and monkeys from the west coast of Africa. [Goundou of course has a much wider distribution than MESNIL is aware of.]

H. S. S.

HERIVAUX. ["Pseudo-goundou" lépreux.] **[Leprous Pseudo-Goundou.]** —*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 867–868. With 1 text fig.

A note upon a case of mixed leprosy in a young female observed in Madagascar who presented on each side of the nose a hard swelling resembling goundou. Puncture fluid showed numerous lepra bacilli. Radiographical examination gave no definite evidence as to whether the bone was enlarged or not. The patient was free from yaws. The case is referred to as one of leprous pseudo-goundou.

[It is a pity more definite information is not given. Leprous nodules occurring in the paranasal position are not uncommon but they essentially are swellings of soft parts while in goundou the affection is of the bone. There seems every reason to suppose that this case should not therefore have been labelled "pseudo-goundou."]

H. S. S.

DEY (Nepal Chandra). A Study of Yaws in Khetri Area, Kamrup, Assam.—*Indian Med. Gaz.* 1930. Aug. Vol. 65. No. 8. pp. 421–426. With 19 figs. on 4 plates. [3 refs.]

CLIMATIC BUBO.

LOW (G. Carmichael). **Climatic Bubo: its Diagnosis and Treatment.**—*Jl. Roy. Nav. Med. Serv.* 1930. Oct. Vol. 16. No. 4. pp. 272–275.

After a short historical survey including an allusion to the question whether climatic bubo of the tropics is identical with lymphogranuloma inguinale, the author mentions those cases under his own observation at the Hospital for Tropical Diseases, London. The intradermal test of FREI was carried out by Dr. Hamilton FAIRLEY using as antigen a gland preparation made from one of the cases by the method described by HELLERSTRÖM. The results were negative. Tests have since been carried out using an antigen supplied by Hellerström in two cases. In both the results have been inconclusive. The author states, "More work will therefore be required before coming to a definite conclusion as to the value of this test and the identity of tropical climatic buboes and other forms of adenitis seen in Europe." The method of treatment advised is that by protein shock after the manner described by HANSCHELL. [The work of other observers on the continent in recent years would seem to have proved the identity of the two conditions mentioned and to place the skin reaction in a sure position.]

H. S. Stannus.

MUSGER. Zur Aetiologie der Nicolas-Durand-Favreschen Krankheit des sog. Lymphogranuloma inguinale. [**Aetiology of Lymphogranuloma inguinale.**]—*Arch. f. Dermat. u. Syph.* 1930. May 27. Vol. 160. pp. 94–97.

The author presents his bacteriological findings in three cases of lymphogranuloma inguinale, the first and third being cases reported by VON FUHS and by VON URBACH respectively. In all three cases a rod-shaped organism was demonstrated in the blood and gland juices and also in sections of affected glands after search. The organism was also recovered in two cases in blood-broth culture but only after seven days. In the tissues the organisms lie between the cells singly or in pairs, sometimes alongside each other, in other cases end to end. Subcultures were obtained best on Loeffler's serum at body temperature ; on agar the colonies are smaller and under magnification appear granular. Growth is slow and occurs aerobically, but the organism is also a facultative anaerobe. Morphologically smears from cultures show the organism to be a slender rod without capsule or spores but often butt-ended at one pole and Neisser preparations show polar staining.

Guineapigs, rabbits, white mice and monkeys were inoculated subcutaneously, intramuscularly, intravenously, intraperitoneally and by the intratesticular route, the first mentioned being the most suitable animal by the intraperitoneal method. Changes occurred in glands after three weeks closely resembling those in the human disease both macroscopically and microscopically.

A series of agglutination and complement deviation tests were contrived but proved negative, while immunological tests were indefinite.

H. S. S.

DUPAS (J.). Le diagnostic de la poradénite inguinale (maladie de Nicolas Durand et Favre et bubon climatique). [**Diagnosis of Climatic Bubo.**]—*Arch. Méd. et Pharm. Nav.* 1930. Jan.–Feb.–Mar. Vol. 120. No. 1. pp. 5–90. [6 pages of refs.] [Sainte-Anne Marine Hosp., Toulon.]

The author gives his observations based on 13 cases of what he classes as "poradénite nostras," 4 cases of "poradénite tropicale (bubon climatique)" and 2 cases of "poradénite bacillaire" [tuberculous], the case histories taking up some 50 pages. The clinical aspects are then discussed, the observer agreeing with others that there is nothing to distinguish those cases arising in Europe from those which have been called climatic bubo. He also points out how difficult it is to make a differential diagnosis from some cases of tuberculous lymphadenitis in the groin. He has not seen any cases in which an extension of the process has affected other groups of gland except the iliac. Swelling of the iliac glands, however, he regards as others have done as rather characteristic. In four only of the 17 cases was there an initial genital lesion. General symptoms were very variable. The polynuclear leucocytosis is usual but of no diagnostic value. Investigations directed towards finding a specific cause were negative. The author did not make use of the intradermal reaction, now so well known, for diagnosis. Treatment is discussed without any new ob-

servations. A bibliography for the years 1922–29 is given and reference made to the bibliography in PHYLACTOS' Lyons thesis (1922).

H. S. S.

RUIZ (Fernando R.) & FOTHERINGHAM (Wenceslao Tejerina). Poradenitis inguinal sub-aguda. [**Climatic Bubo.**]—*Semana Méd.* 1930. Oct. 23. Vol. 37. No. 43 (1919). pp. 1249–1271. With 19 text figs.

A general account of this condition as regards its incidence and a detailed description of the morbid anatomy and histology of the affected glands, illustrated by reports of three cases and photographs depicting the naked eye and microscopic changes. The author, while noting that the disease is one of young adults, maintains that there are considerable numbers not due to sexual intercourse. He divides the symptoms into the stages of (1) induration of glands with slight rise of temperature of variable duration, succeeded by (2) softening, breaking down and suppuration with involvement of overlying skin to produce (3) fistulae. Treatment by antimony is mentioned, but the only certain cure is by extirpation. All these points are exemplified in the three cases detailed.

H. H. S.

GARCIA MALDONADO (L.). Diez casos de bubon tropical. [**Ten Cases of Climatic Bubo.**]—Reprinted from *Rev. Soc. Med.-Quirurg. del Zulia.* [Venezuela]. 1930. Mar. 31. Vol. 4. No. 3. pp. 150–158.

All ten were males between 20 and 32 years of age. Three denied having ever contracted or risked venereal disease, four had had gonorrhoea fairly recently (six months or less), and three had had venereal disease some years before. All were treated with stibenyl and eight were cured with doses varying from 30 cgm. to 2·7 gm. and given in 15 to 50 days; two benefited but slightly; these received 3 and 4 gm. respectively in 76 and 70 days. The author finds an intradermal test with pus heated to 56° C. useful in diagnosis.

H. H. S.

FREUDENTHAL (W.). Unspezifische Wassermann usw.-Reaktion bei Lymphogranuloma inguinale. [**Non-Specific Wassermann and Similar Reactions in Lymphogranuloma inguinale.**]—*Deut. Med. Woch.* 1930. Dec. 26. Vol. 56. No. 52. p. 2216. [2 refs.] [Skin Clinic, Univ., Breslau.]

The following observations were made in connexion with a 39-year-old male patient at the Breslau polyclinic. On November 26th, 1929, he presented a roseolous eruption; the W.R. was negative. On March 3rd, 1930, he returned with the inguinal glands on both sides swollen; no lesion on penis found. Lymphogranuloma reaction of Frei was +++ using two antigens which gave negative reactions in two controls. A diagnosis of L.I. was made and the treatment by neostibosan was instituted, the total amount given in two months being 4·3 gm. During treatment the gland masses increased in size, softened and opened on the surface, right side on 30.iv.30, left 18.iv.30.

The following table gives the serum reactions :—

	W.R.	Citocholl	Meinicke Clear	Kahn	Meinicke Turbid
26.xi.1929 ...	0	0	0	—	—
3.iii.1930 ...	0	?	0	+?	—
7.iii.1930 ...	?	+	0	+	0
10.iii.1930 ...	?	+	0	+	0
15.iii.1930 ...	?	+	0	+	0
23.iii.1930 ...	0	+	0	0	—
7.iv.1930 ...	0	0	0	0	0
13.v.1930 ...	0	0	0	0	0

The positive reactions might suggest a suspicion of syphilis but the Luetin reaction was negative and there was no history of syphilis (or malaria) and no signs or symptoms of that disease. These partial temporary positive reactions must therefore be looked upon as non-specific reactions comparable with those seen sometimes in malaria and less commonly in ulcus molle. These facts, however, do not seem to be generally recognized as only RAVAUT and RABEAU have previously alluded to them. It is important from all points of view that these possibilities be not forgotten.

H. S. S.

TARAYRE. La lymphogranulomatose (maladie de Nicolas-Favre) dans le milieu militaire colonial. [**Climatic Bubo in the (French) Colonial Army.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1930. July. Vol. 8. No. 7. pp. 716–728. [1 ref.]

A general discussion on climatic bubo with histories at considerable length of two cases observed in Indochina.

H. S. S.

ISOTTI (Filippo). Contributo alla diagnosi di adenite climatica mediante la intradermoreazione. [**The Intradermal Reaction in the Diagnosis of Climatic Bubo.**]—*Arch. Ital. Sci. Med. Colon.* 1930. Aug. 1. Vol. 11. No. 8. pp. 480–489. With 1 text fig. English summary (4 lines). [Lab. of Colonial Path., Villa Torri, Bologna.]

The author confirms the usefulness of the intradermal reaction, already fully described by other writers, in the diagnosis of cases of climatic bubo met with in the province of Bologna.

H. S. S.

LÖHE (H.) & BLÜMMERS (K.). Weitere Beobachtungen ueber das Vorkommen der Lymphogranulomatosis inguinalis in Berlin. [**Lymphogranuloma inguinale in Berlin.**]—*Med. Klin.* 1930. May 30. Vol. 26. No. 22. pp. 807–808. [1 ref.] [Rudolf Virchow Municipal Hosp., Berlin.]

A short note emphasizing the absolute specificity of the intracuti-reaction in lymphogranuloma inguinale.

H. S. S.

HVAL (Einar). Lymphogranulomatosis inguinalis subacuta.—*Norsk. Mag. f Laegevidenskapen.* 1930. Nov. Vol. 91. No. 11. pp. 1229–1234. [2 refs.] [In Norwegian.]

GRANULOMA VENEREUM.

GIGLIOLI (George). **The Differential Diagnosis of Phagedenic Chancroid and Granuloma Inguinale.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Apr. 17. Vol. 23. No. 6. pp. 579–589. With 2 charts & 1 plate. [12 refs.]

The author, writing upon observations made in Central America, shows that granuloma inguinale and venereal phagedena are often confused and cases wrongly diagnosed. Unrecognized cases of V.P. he believes account for many of the so-called tartar emetic resistant granulomas and would thus explain cases reported by HANSCHELL. The two conditions may easily be diagnosed clinically and a table of differential diagnosis is given. In V.P. he finds the intradermal allergic reaction, using extracts of Ducrey's strepto-bacillus, specific. For G.V. he believes antimony to be specific and protein shock treatment useless; for V.P. protein shock or vaccine therapy is indicated.

H. S. Stannus.

BIRCH (C. Allan). **Granuloma inguinale resembling a Primary Chancre.**—*Brit. Med. Jl.* 1929. Aug. 24. p. 345. [Royal Infirmary, Liverpool.]

Dr. Birch records the case of a ship's steward seen at the Royal Infirmary, Liverpool, who presented a punched-out ulcer with undermined edges, bleeding easily, the base covered with healthy granulations, situated on the glans penis, of three months duration which originally developed as a papule four days after exposure to venereal infection in Brazil. W.R. negative, spironemes not found and anti-syphilitic treatment ineffective. After five injections of stibosan given on alternate days with a total of 1·5 grams complete epithelialization had occurred.

H. S. S.

MACIEL (Heraldo). Notas colhidas na observação de um caso do granuloma venereo. [**A Case of Granuloma Venereum.**]—*Sciencia Med.* 1929. Oct. Vol. 7. No. 10. pp. 517–522. With 1 plate.

A full account of a case of granuloma venereum in a male native of Pernambuco infected at the time of a single extra-conjugal coitus in Rio Grande in 1924. A lesion in the form of a nodule at the side of the anus with intense pruritus appeared. Pederasty was denied. Returning to Rio de Janeiro at the end of the year, he continued sexual relations with his wife until six months before his entry into hospital. The wife during this time had not acquired the disease and during her husband's stay in hospital gave birth to a child which up till the age of four months presented nothing abnormal. In the man the disease had been slowly progressive, invading the anal margin, perineum, scrotum and groins. At first painful, later it became painless.

Local treatment by silver nitrate and thermocautery had been tried, later antisyphilitic treatment was administered in spite of a negative W.R. In 1928 the condition was recognized, the Calymmatobacterium was found in abundance in the advancing edge of the ulcer and treatment with neostibosan yielded good results.

H. S. S.

BERIBERI AND EPIDEMIC DROPSY.

MAHADEVAN (V.) & RAMAN (T. K.). **Report on an Investigation of Beriberi at Guntur.**—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 555–564. With 2 graphs, 3 maps & 4 figs. in text. [6 refs.] [Govt. Headquarters Hosp., Guntur.]

The district of Guntur, as regards beriberi, is one of the most affected regions of the Madras Presidency. During the year 1929–30 the authors investigated over 100 cases of the disease. The following are among the observations made. Though many cases occur among Hindus, the relative incidence in this community is actually lower than in others. Married people are more often affected than single, and the highest age-incidence is between 16 and 40 years. Infantile beriberi is not seen in this district. Males are more frequently attacked than females, and labourers more than others. [From a table, it would appear at first sight that police constables were especially liable.] The greatest beriberi incidence is between June and October. A table shows the number of rice factories in various parts of the Guntur District, and their relation to the number of cases ; while geographical details are shown by maps.

The autopsy findings are collected from 4 cases. In brief, these are—effusion in all serous cavities, especially the pericardium ; dilatation and hypertrophy of the heart ; and congestion of the liver, spleen, kidneys, brain, suprarenals and duodenum.

There are four types of the disease : (1) *Larval type*, or earliest stage, in which paraesthesiae, slight swelling and tenderness of the calf muscles, anaesthesia of the legs, and diminished or absent knee jerks are noticed. (2) *Wet Beriberi.* Besides the usual findings, the authors stress the presence of fever of about 5-days duration in some 25 per cent. of the cases. (3) *Paraplegic or Dry Beriberi.* This is regarded as an advanced stage of the wet type with paralysis of the affected limbs, ataxic gait, wasted calf muscles and foot drop. (4) *Acute pernicious form.* Five out of 91 cases admitted to hospital during the year were of this type. The patient is bedridden, orthopnoeic and oedematous in the legs or over the whole body, except the scrotum. Dilatation of both chambers of the heart dominates the clinical picture, with resulting cardiac failure, and enlargement of the liver but no cyanosis.

Treatment consists of rest in bed ; a diet of milk (2 pints), bread (12 ozs.), plantains (2) ; complete withdrawal of rice ; strychnin, iron and small doses of salvarsan. Vitamin B is given in the form of toddy (2 ozs.), t.d.s. ; meat, eggs, fruit, etc., are added to the diet. In acute cases with cardiac dilatation adrenaline 1 cc. twice a day, and atropine grain 1-100 once a day, are injected. Venesection relieves the dyspnoea. Tincture of digitalis 20 minims, every 4 hours in the first 48 hours, gives very good results. Only fluid diet, with toddy, is allowed.

In the section of the paper dealing with etiology, four different types of diet are given which were consumed by beriberi patients. With one exception, these diets show that the disease can occur when all the essential food principles and vitamins are present. From tables showing the staple articles of diet in the various parts of the district, it is seen that the disease is more common in those places where rice is the staple food. The authors state that under-milled rice is the usual form eaten by the coolies. Nevertheless, the patients responded

rapidly to the administration of vitamin B. The presence of an infection is suggested, and it is thought that the organism lies dormant in the endemic areas during the hot weather, and multiplies during the rainy season. The good results obtained from salvarsan injections suggest the possibility of the organism being a spirochaete.

A. D. Bigland.

JOLLY (G. G.). **"Beriberi" in Cheduba Island, Arakan, Burma.**—*Indian Med. Gaz.* 1930. July. Vol. 65. No. 7. pp. 383–386.

Cheduba is a large island off the Arakan coast. Beriberi has long been endemic there, but in 1929 it was unusually prevalent. "During the rainy season of 1929, approximately 1,650 cases with 188 deaths occurred among a population of 32,500. The coastal villages suffered most, those in the interior being comparatively free. The disease is definitely seasonal, its incidence during the rains, July and August, being the months in which most cases develop." At this season, the diet in the coastal villages consists of white rice, an insufficient quantity of salt fish, a few green leaves and bamboo shoots. In the interior, the dietary conditions are very much better, vegetables and fruit being grown. In the coastal villages also, the local toddy made from the Dhani palm is an important article of diet. During June and July, the supply of this commodity practically ceases owing to the sap becoming scanty.

There seems to be little doubt that the disease is due to vitamin B deficiency. In the preventive campaign, it is proposed to include red rice and rice cleanings in the diet, to store legumes for consumption in the germinated form and, possibly, to use toddy yeast as a food.

A. D. B.

DE LOS REYES (J. M.). **Beri-Beri and Avitaminosis.**—*Eighteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1929. pp. 138–145. With 1 text fig. [United Fruit Co. Hosp., Banes, Cuba.]

Beriberi is endemic in certain districts of Cuba. The disease is apparently associated with vitamin B deficiency; thus the diet consists namely of cheap, over-milled and long-stored rice, beans, in the cooking of which nearly all the vitamin B is removed, and white bread, which is made from super-milled flour. The planting of green vegetables gave most satisfactory results as regards prophylaxis. In spite of this evidence, the author is of the opinion that vitamin B deficiency is not the sole cause. It certainly is remarkable that the cases came almost entirely from one district, where the dietary conditions were similar to those obtaining in other places.

Another finding, somewhat opposed to the avitaminosis theory of beriberi, is the prevalence of eosinophilia in the cases. This ranged from 3–18 per cent., though the stools were relatively free from parasites and skin affections were few.

Notes are given of 36 cases, all Cubans, except one Chinaman and one Spaniard. According to clinical findings, the author has grouped the cases into five categories. *Group* 1 (2 cases) in which cardiac symptoms predominated. Both these patients died, the autopsies revealing cardiac hyperprotrophy and the other usual findings. *Group* 2 (19 cases): polyneuritic symptoms predominated. *Group* 3

(1 case): oedema predominating. *Group* 4 (6 cases): polyneuritis and oedema were both present. *Group* 5 (7 cases) with ill-defined symptoms.

Treatment consisted in giving a diet rich in vitamin B and free from rice and refined cereal carbohydrates. Massage and nux vomica were found helpful in the paraplegic types. Yeast gave only indifferent results. A. D. B.

AYKROYD (W. R.). **Beriberi and Other Food-Deficiency Diseases in Newfoundland and Labrador.**—*Jl. Hygiene.* 1930. Aug. Vol. 30. No. 3. pp. 357–386. With 4 charts in text. [33 refs.] [Lister Inst., London.]

At the beginning of this century, beriberi first became common on the Newfoundland coast. The disease has been endemic since, but in the last decade it has become less frequent and seems to be disappearing. The author gives the following summary of his paper:—

"1. Beriberi occurring on a white-flour staple is similar to that occurring on a rice staple.

"2. Under the difficult climatic conditions of North Newfoundland and Labrador, families are obliged to buy food stores in November or December to last until the following May or June. When poverty prevents a sufficient variety of foodstuffs, and calories are the foremost consideration, white flour with few extras forms the main dietary and beriberi tends to occur in April, May or June. It occurs in families who have grown few vegetables and shot little game.

"3. The disease attacks more men than women, and very rarely children between the ages of infancy and puberty. The age and sex incidences of beriberi are difficult of explanation and differ in different countries.

"4. Infantile beriberi probably occurs in Newfoundland and Labrador, but is largely unrecognised.

"5. The main cause of beriberi is vitamin B_1 deficiency, but the diets of patients suffering from beriberi are deficient in other respects.

"6. It is suggested that the infrequency of wet Beriberi in Newfoundland may be due to the fact that wheat flour has a higher protein content than polished rice.

"7. Since poverty and deficiency disease are rigidly associated, prevention is an economic rather than a medical problem.

"8. Severe scurvy and rickets are not often met.

"9. Functional hemeralopia or night blindness occurs mainly during the summer among men. It occurs on a diet deficient in vitamin A, and is rapidly curable by vitamin A containing foods, a fact well known to the Newfoundlanders. The disease may occur in men taking a deficient diet for less than one month. Other evidences of vitamin A deficiency are lacking.

"10. Tuberculosis, severe dental caries, functional stomach complaints and constipation are common. Gastric and duodenal ulcer, diabetes and obesity are rare."

A. D. B.

VIANNA (Miguelote) & PEDRO (Antonio). Etudes sur l'étiologie du kakké ou beriberi. [**Aetiology of Beriberi.**]—*C.R. Soc. Biol.* 1930. Oct. 16. Vol. 105. No. 27. pp. 105–107. [Bios Inst., Nictheroy, Brazil.]

In February 1930 six cases of beriberi occurred among prisoners at Nictheroy, Brazil. In only one of these cases was the Bacillus Kakké of

Matsumura isolated from the stool. The only difference between this organism and Escherichia Coli is that the former ferments saccharose. The patient's serum agglutinated the organism isolated from the stool up to a titre of 1 in 400, and the communior up to 1 in 100. The serum of another beriberi case gave a titre of 1 in 100 with the Bacillus Kakké but no agglutination with communior. In two other cases, there was an agglutination figure of 1 in 80 with communior, and no reaction with B. Kakké. The serum of the last two cases showed no agglutination reactions with either organism.

To study the part played by starvation in predisposing to this infection, the authors fed two pigeons on a polished rice diet. Both birds died of typical avian polyneuritis, and from the rectal contents of each was isolated an organism similar to the above. Anti-kakké and anti-communior sera were prepared by intravenous injections of rabbits, with increasing doses of the respective organism. The organisms from one pigeon (not used for immunization) and from the human beriberi case were agglutinated by the anti-kakké serum up to a dilution of 1 in 400. The organism from the other pigeon (the one used for immunization) gave a figure of 1 in 500. Absolutely negative results were obtained with Escherichia communior. The anti-communior serum only agglutinated the sample used for immunizing (1 in 400) and had no effect upon either of the organisms derived from the pigeons or the human beriberi case.

Thus it would appear that an organism indistinguishable from the Bacillus of Matsumura and similar to the Escherichia communior (except for serological reactions) was isolated from a case of human beriberi and from two cases of experimental polyneuritis columbarum.

A. D. B.

OHTA (Kohshi). Zur Klinik der Säuglings-Beriberi. [**Symptomatology of Infantile Beriberi.**]—*Jahrb. f. Kinderheilk.* 1930. June. Vol. 128. (3 Ser. Vol. 78.) No. 1/2. pp. 1–9. With 4 figs. [Children's Clinic, Izumibashi-Charity-Hosp., Tokyo.]

Infantile beriberi is a disease pre-eminently of breast-fed babies. In the University Children's Clinic at Tokyo only 16 out of 430 such cases were bottle-fed. Males are apparently more liable than females, and the onset is most frequent in the third month of age, and during the period May-October. Statistics show that in two-thirds of the cases the mothers suffered from beriberi during pregnancy or lactation, though the severity of the disease in the mother bears no necessary relation to that in the child.

The disease is ushered in with vomiting and green stools. Later, tachycardia and dyspnoea develop, these being ascribed to dilatation of the right side of the heart, as evidenced by clinical and radiological observations. Oedema occurs either as the result of cardiac failure or spontaneously, and it is interesting to note that it is rarely general in distribution. In the nervous system are to be found peripheral neuritis, affections of the oculo-motor and recurrent laryngeal nerves and a retro-bulbar neuritis.

Treatment consists of (*a*) attention to the mother's diet during pregnancy and lactation, by adding rice-polishings, and (*b*) in the case of the infant, by intermitting artificial and breast-feeding, and by the administration of vitamin B preparations.

A. D. B.

OHTA (Kohshi) & IZUMITA (Tomotake). Zur Kenntnis der Funktionsanomalie des Verdauungskanals bei der Säuglings-Beriberi. Erste Mitteilung: Ueber die Form und die motorische Funktion des Magens bei der Säuglings-Beriberi. [**The Form and Motor Function of the Stomach in Infantile Beriberi.**]—*Jahrb. f. Kinderheilk.* 1930. June. Vol. 128. (3 Ser. Vol. 78.) No. 1/2. pp. 10–39. [26 refs.] [Children's Clinic, Izumibashi-Charity-Hosp., Tokyo.]

Vomiting is a common symptom in infantile beriberi, especially in the early stages. The authors have been at considerable pains to discover, if possible, the cause. From radiological examination of the stomach it would appear that there is no characteristic alteration in the shape of this viscus in the disease. By the use of the stomach-tube, however, it was found that there was a very definite delay in emptying of the stomach in these infants. The cause of this delay is far from clear, though much work was done in an effort to elucidate the matter. Thus, it was found that feeding beriberi infants with normal mothers' milk, cows' milk and beriberi mothers' milk, respectively, gave a delayed emptying-time increasing in this order. Further experiments showed that neither the vitamin B nor fat-content of the mothers' milk was at fault in this respect. It is interesting to note that the rapid improvement brought about in these sick children by the intramuscular administration of oryzanin was followed, for the most part, by a corresponding diminution in the gastric delay. By the use of pilocarpine, atropine and adrenalin, in small doses, it would appear that the vegetative nervous control of the stomach may play a part in the symptomatology. **A. D. B.**

i. INAWASHIRO (Rokuro) & HAYASAKA (Enaji). **Studies on the Effect of Muscular Exercise in Beri-beri. First Report. The Influences of Muscular Exercise upon the Gas and Carbohydrate Metabolism. (Resynthesis of Lactic Acid, Acidosis and the Entity of Fatigue in Beri-beri.)**—*Tohoku Jl. Experim. Med.* 1928. Dec. 30. Vol. 12. No. 1. pp. 1–28. With 2 text figs. [38 refs.]

ii. HAYASAKA (Enaji) & INAWASHIRO (Rokuro). **Studies on the Effect of Muscular Exercise in Beri-beri. Second Report. The Influences of Muscular Exercise upon the Circulatory Apparatus, with Special Reference to its Dynamic Function as well as the Utilisation and Supply of Oxygen in Beri-beri. (The Cause of the Hypertrophy and Dilatation of the Heart in Beri-beri and the Relaxation of the Peripheral Blood Vessels.)**—*Ibid.* pp. 29–61. With 4 text figs. [81 refs.]

i. Experiments were undertaken to investigate the metabolism of exercise in beriberi. The following are among the results obtained. In acute stages of the disease the respiratory quotient is raised by muscular action to a fairly normal degree but soon after exercise it falls far below the original value. At the height of the disease an acidosis is present even at rest and this becomes more marked after exercise. A similar change, but in the opposite direction to the above, is found in the lactic acid content of the blood. The resynthesis of lactic acid resulting from exercise is slower than that found in normal subjects. The blood sugar is increased after exercise in acute cases, probably owing to acceleration of adrenalin output. The acidosis in beriberi is partly due to a disturbance of lactic acid resynthesis and partly to a shortage of fixed alkali. The swelling of muscles, especially

in the gastrocnemius, which may occur even at rest, is due to a local acidotic change.

ii. In acute stages of beriberi the " minute volume " (i.e., the volume of blood which flows through the heart per minute) and the " stroke volume " (i.e., the minute volume divided by the pulse rate) are increased during rest, while after exercise the increase is greater still, and returns to the initial value more slowly than normal. " Muscular exercise elevates the maximum blood pressure less and lowers the minimum more in the acme of beriberi than after its recovery." It was found that the rate of oxygen supply through the capillaries into the tissues is lessened in beriberi patients and that oxygen utilization is decreased by exercise. The author suggests that the blood flow increase in the disease is due to relaxation of the peripheral vessels and to increased secretion of adrenalin or similar substances. " Since muscular exercise increases blood flow and acidosis markedly in beriberi, it will accelerate the hypertrophy and dilatation of the heart."

A. D. B.

KEEFER (Chester S.) & HSIEH (C. K.). **The X-Ray Examination of the Heart in Beriberi.**—*Radiology.* 1929. Sept. Vol. 13. No. 3. pp. 211–216. With 6 figs. [7 refs.] [Peking Union Med. College, Peking.]

The roentgenologic study of the heart in beriberi comprised examination by the fluoroscope, and the making of teleoroentgenograms at different levels. The authors summarize their work as follows :—

" (1) The heart was enlarged in all cases of beriberi with cardiac insufficiency.

" (2) There was considerable cardiac enlargement in some patients without cardiac insufficiency.

" (3) The enlargement was principally right-sided, involving both the right auricle and ventricle, and the pulmonary artery was quite prominent in many.

" (4) There was enlargement in the region of the superior vena cava. This shadow diminished with the decrease in the size of the right auricle. The left auricle and ventricle were enlarged to a lesser degree.

" (5) The size and configuration of the heart changed completely following treatment, and assumed a normal size and shape after a varying length of time."

A. D. B.

i. AALSMEER (W. C.) & KOCH (E.). Bijdrage tot de kliniek der beriberi. 1. De bloeddruk. [**Contribution to the Clinic of Beri-beri. 1. The Blood Pressure.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Apr. 1. Vol. 70. No. 4. pp. 383–393. [1 ref.]

ii. —— & SYLVANUS (D.). Bijdrage tot de kliniek der beri-beri. 2. De vaattoon, vroegsymptoom eener afwijking in de circulatie. [**2. The Vascular Murmur, Early Symptom of Abnormal Circulation.**]—*Ibid.* May 1. No. 5. pp. 425–435. [7 refs.] [Nias Med. Clinic, Soerabaja.]

iii. ——. Bijdrage tot de kliniek der beri-beri. 3. Bloeddruk en vaattoon. Hun onderling verband in het algemeen en hun beteekenis voor beri-beri in het bijzonder. [**3. Blood Pressure and Vascular Murmur. Their Relation in General and their Special Significance for Beriberi.**]—*Ibid.* June 1. No. 6. pp. 535–541. [2 refs.] [Nias Internal Clinic, Soerabaja.]

i. If a vessel murmur is heard above a certain part of an artery the diastolic bloodpressure at this spot is zero. The lowering of the diastolic

pressure in beriberi and especially its rise during recovery are important phenomena in the clinical picture, indicating the stage in which the patient is. The authors distinguish 3 groups of cases: (1) cases without vessel murmurs; (2) cases with a crural, but without a brachial murmur; (3) cases without crural and brachial murmurs. The accompanying motor and sensory nerve symptoms may be of any degree, especially in cases of some duration which have been influenced in their course by some kind of dietetic treatment.

ii. The murmur is usually limited to the larger arteries; if it appears over the smaller arteries it interferes with bloodpressure estimation. In beriberi these difficulties usually arise and other diseases which might cause the same phenomenon (aortic insufficiency, hyperthyroidism) could hardly cause trouble in differential diagnosis. Illustrative cases are quoted.

In beriberi, with the exception of the very serious "shoshin" cases, adequate treatment (rest and diet) causes the murmur to disappear. In other cases the influence of treatment is never so pronounced. The appearance of a murmur, together with lowering of the minimal bloodpressure, marks the beginning of beriberi, long before motor disturbances induce the patient to take rest.

iii. Besides the three cardinal symptoms of beriberi recognized so far (oedema, nervous symptoms and cardiac alteration), a fourth group of vascular symptoms well deserves our attention.

Apart from intercurrent influences these vascular symptoms run the following course:

(*a*) The heart's action becomes more frequent, the heart sounds louder, and there are marked pulsations of the aorta and the carotids, but no crural murmur. The diastolic blood pressure may be lowered, not by loss of tension of the vessel wall, but by the diminished force of the heart muscle. Generally the pressure is normal; it may even be increased by reaction of the peripheral vessels.

(*b*) There is a murmur over the crural, but not over the brachial artery. If the diastolic pressure, measured at the brachial artery, is lowered such is caused in the way mentioned under (*a*).

(*c*) The bloodpressure decreases by loss of tone of the arteries, and arterioles. As long as any diastolic pressure exists, no vessel murmur is heard. The bloodpressure cannot possibly be increased, and is often lowered.

(*d*) There is a murmur also over the smaller arteries, the diastolic pressure approaches zero and cannot be measured. In this stage only the systolic pressure diminishes and the patient may die.

W. J. Bais.

CHOPRA (R. N.) & BASU (U. P.). **Cardiovascular Manifestations of Epidemic Dropsy and their Treatment.**—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 546–550. [4 refs.]

A large number of cases of epidemic dropsy came under the care of the authors in various Calcutta hospitals during the latter half of 1929, and 19 of these form the material of the present investigation. The age of the patients varied between 6 and 45 years. There were 15 males and 4 females; 14 Hindus, 4 Mahommedans and one an Indian Christian. The symptoms are examined in detail.

(1) *Oedema of the legs.* This is one of the very earliest symptoms. It is due to capillary dilatation and increased transudation. This view is supported by autopsy findings, sections showing enormous increase in vascularity of the subcutaneous fatty tissue. (2) *Diarrhoea.* This, too, is a very common symptom and is due to congestion of the intestinal mucous membrane. Most of the abdominal organs share

in the congestion. (3) *Fever.* Follows absorption of toxic substances from the alimentary tract. Owing to damage to the mucous membrane, the intestinal flora, even, may invade the blood stream. (4) *Palpitation.* The disordered action of the heart is due, firstly, to the action of toxins upon the accelerator mechanism, and secondly, to increased vascularity and oedema of the cardiac muscle. In later stages, the heart is dilated. (5) *Dyspnoea.* This is at first due to toxic action upon the respiratory centre, but later to structural changes in the heart and lungs. (6) *Praecordial pain.* Is usually due to oedema of the cardiac muscle. It may, however, be referred from the alimentary tract. Occasionally, pericarditis is the cause of the pain. (7) *Cardiac Asthma*—probably due to pulmonary oedema. (8) *Cough*—follows congestion of the upper respiratory tract.

In the discussion of physical signs, the cardiovascular system is of the greatest interest. Early in the disease, tachycardia and muffling or reduplication of the mitral first sound are remarked. Later, murmurs of relative incompetence of the mitral valve appear, with dilatation of the left ventricle. The right side of the heart usually shows no enlargement. Sometimes both ventricles dilate simultaneously, with the appearance of a temporary mitral presystolic murmur, probably due to bulging of the intraventricular septum into the right ventricle. Cyanosis and jugular pulsation are notably absent. Congestive cardiac failure does not usually appear as in beriberi. Increased frequency of the pulse rate and sinus arrhythmia are the rule. In the early stages, systolic blood pressure is raised, but this falls with the onset of structural changes in the heart. In epidemic dropsy the E.C.G. shows little more than sinus arrhythmia. Anaemia and more or less generalized oedema are the rule.

In the authors' opinion, the mechanism of production of the above symptoms and signs is as follows :—An infection invades the gastro-intestinal tract causing diarrhoea. Later, owing to damage of the mucosa, toxins are absorbed, and these act upon the sympathetic nervous system and the capillaries. The changes in the heart in epidemic dropsy are contrasted with those in beriberi, as described by WENKEBACH [see this *Bulletin*, Vol. 26, p. 517].

Treatment consisted in confining the patients to bed and giving a liberal protein diet, in which wheatbread or chapaties had been substituted for rice. In cardiac failure digitalis is not only ineffective but may be harmful. It should only be used in those comparatively rare cases of right heart failure. Tincture of ephedra (made from the Indian species of ephedra) is a very valuable remedy. If any thyroid deficiency is present, 1 grain of thyroid extract is given, 2 to 3 times a day. When oedema of the lungs occurs venesection should be tried. The authors state that using the above methods of treatment, they did not lose a single patient in the series.

A. D. B.

SHANKS (George). **Pathology of Epidemic Dropsy in Bengal.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Jan. 31. Vol. 24. No. 4. pp. 377–378.

Pathological findings in four fatal cases of epidemic dropsy are discussed. The feature of special interest is a telangiectatic dilatation of the capillaries, most obvious in the fatty tissue whether subcutaneous,

subpericardial or subperitoneal. Similar changes are present in the lungs, beneath the endometrium, in the cervix uteri, in the ovaries, and in the intestines ; in fact, wherever the vessels are least supported. Sections show practically no signs of inflammatory reaction and there is little tendency to haemorrhage. Sometimes, however, haemangioma-like nodules appear on the skin and these may rupture and bleed.

A. D. B.

SHAHA (Braja Ballav). **Epidemic Dropsy.**—*Calcutta Med. Jl.* 1930. May. Vol. 24. No. 11. pp. 417–431. [13 refs.]

Successive outbreaks of epidemic dropsy have occurred in Calcutta every decade since 1907, the last severe epidemic being in 1926. The disease is essentially different from beriberi.

During epidemics, various types are encountered. The oedema affects dependent parts and has a peculiarly solid feel, but it pits on pressure. Fever of an intermittent nature, lasting usually not longer than 1 week, is sometimes met with. In addition to a cutaneous rash, another skin condition is sometimes seen :—" Here and there, one finds red dots, varying from the size of a split pea to as big as a small grape, made up of blood vessels in the form of warts . . . they are sometimes sessile, but may be pedunculated ; sometimes they bleed. They occur mostly on the lower limbs, but may occur on the trunk, both front and back, and rarely on the abdomen." With recovery from the disease, these " blood warts " disappear. Cardiac failure of a congestive type and diarrhoea, sometime dysenteric, are common. There is no neuritis, and the lost knee jerk, when it occurs, is only due to the inability of the quadriceps to move the heavy water-logged leg. Dimness of vision and glaucoma are sometimes encountered.

The evidence that the disease is in some way associated with rice, is briefly discussed. Some think that the fault lies in throwing away the strained water in which the rice is boiled. This fluid is called Fen and is highly nutritious. A reference to classical literature, however, shows that the practice of discarding Fen was, at any rate, in vogue in 1500. Others blame the faulty storage of rice, but this does not obtain in the villages attacked in the present outbreak (1930). The mustard oil factor is regarded as important by some, but the possibility of an infection being present has certainly many facts to support it. Thus, in 1929, an epidemic raged in the town of Faridpur, during which a young man, finding his legs becoming swollen, returned to his village home. Within a fortnight of his return, 14 members of the family contracted the disease.

Among the more important autopsy findings, may be mentioned the following :—Subserous haemorrhages in the lungs, oedema and congestion of the myocardium, and vascular congestion of the sub-mucosal vessels of the intestine, with denudation of the epithelium in places. The thyroid shows diminution of colloid, and epithelial hyperplasia. The liver presents a nutmeg appearance, the spleen is congested, and the skin shows increased vascularity and oedema with exudation of lymphocytes and endothelial cells. The nervous system reveals no definite change. No characteristic organism could be isolated from the blood, urine, or stools. Blood examinations reveal a secondary anaemia, leucocytosis and eosinophilia. Many biochemical investigations were undertaken, but the results were not particularly noteworthy. It may be mentioned that, in most cases,

the globulin content of the serum was three times the albumin content or more ; the normal ratio of albumin to globulin being 3 : 2.

The author does not agree with the usual therapeutic method of excluding rice and substituting meat and bread in the diet. The treatment is symptomatic, but stress is laid upon the importance of rest. For cardiac failure, digitalis and intravenous injections of glucose are beneficial. In extreme cases of right-heart engorgement venesection should be tried.

A. D. B.

AALSMEER (W. C.). Nieuwe inzichten in de beteekenis van enkele verschijnselen bij de beri-beri.—*Nederl. Tijdschr. v. Geneesk.* 1930. May 24. 74th Year. 1st Half. No. 21. pp. 2640–2650. [4 refs.]

GRATEROL Y MORLES (J.). Contribución al estudio del beriberi.—*Gac. Méd. de Caracas.* 1929. Aug. 15. Vol. 36. No. 15. pp. 221–226.

VEDDER (Edward B.) & FELICIANO (R. T.). An Investigation to determine a Satisfactory Standard for Beri-beri-Preventing Rices.—*Far Eastern Assoc. Trop. Med. Trans. Seventh Congress, British India, 1927.* Vol. 3. pp. 375–408. With 8 charts & 2 plates. [7 refs.]

PELLAGRA.

SHELLEY (Horace M.). **Pellagra in Nyasaland.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. June 30. Vol. 24. No. 1. pp. 9–22. With 4 text figs. (1 map). [8 refs.]

Pellagra is endemic in Nyasaland and is especially prevalent in the Central Prison at Zomba. It was first described by STANNUS in 1910 and later a report was made by Milne TOUGH (1922). "The disease attacks old and young, males and female, strong and weak, and natives of all local tribes." There is a marked seasonal incidence, cases chiefly occurring in August, September and October, and again during January and February. The author is of the opinion that diet is not a very important etiological factor. Referring to the prison diet, he states :—

"When Stannus made his original observations, the staple diet consisted of 1½ lb. of rice per day, with ½ an ounce of salt, occasional green food and fish or meat once fortnightly. He reported 131 cases during the period 1910–1913. In 1914 the diet was revised and improved, and during the year 12 cases occurred. In 1920 the diet was further modified and improved, and no cases were reported during the year, but in 1922, the prisoners still enjoying exactly the same diet, 41 cases occurred, and in 1923 another 41 cases were reported. In 1924 the rations were again modified, but 137 cases, with four deaths, resulted. In 1925, 63 cases occurred ; 1926, only 7 cases ; 1927, 30 cases ; and 1928, 48 cases."

Milne TOUGH, in 1922, carried out dietetic experiments and found that the addition of ½ lb. of fresh meat daily did not increase the rate of recovery. The prison and lunatic asylum received exactly the same diet, but in the former prisoners are herded together in one cell, while in the latter institution this is not the case. Pellagra is not so common in the asylum as in the prison.

In the pathological and clinical sections of the paper stress is laid upon the atrophy and fibrosis of the thyroid gland and the myxoedematous appearance of some of the cases. The distribution and symmetry of the dermatitis suggest a nerve root origin of the condition. Pellagra can be either acute or chronic, the latter being sub-divided into the following types : subthyroid, gastro-intestinal, paralytic and mental.

Therapeutically great benefit results from giving 2 grains of dried thyroid extract, and in a group of over 100 pellagrins, treated by thyroid tablets during 1924, only 8 showed recurrence in the following year [see also this *Bulletin*, Vol. 23, p. 685].

A. D. Bigland.

MCKENZIE (A.). **Pellagra in Nyasaland.** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. Nov. 25. Vol. 24. No. 3. pp. 360–361.

The writer contrasts his recent experience of pellagra in Tanganyika, with that of Dr. H. M. SHELLEY in Nyasaland. The disease is rare in the former territory, only one case being recorded between 1919 and 1928. During the first quarter of 1930, four cases occurred in a local jail. The periods of confinement before the rash appeared varied between one and five months.

Regarding the prison diet, the writer states :—

" The daily ration of these prisoners was whole maize, 2 lb. ; beans 5 oz. ; oil or ghee ½ oz. ; salt ¼ oz. Two lemons per week were also allowed. I attempted to revise the diet to bring it more into line with what was customary outside. Meat here, however, is scarce, and unless a native is wealthy, is not regularly eaten. Spinach and green vegetable are used to flavour the staple diet of maize, while *pombe*, a beer made from millet, is much drunk. Accordingly, for the whole jail, I added to the ration 4 oz. of spinach and 1 oz. of dry yeast per day. To two of the pellagrins only I gave 6 oz. of meat per day."

In six weeks, the two pellagrins who received the meat ration were cured. Of the other two, one's condition had grown worse up to discharge (he was then lost sight of), while the other, on regaining his freedom, bought meat for himself, and in about three weeks he was well. It was noted that protection of the skin from the sun caused the rash to disappear. Since the issue of the spinach and yeast ration, no further cases have appeared in the jail. Meat was both preventive and curative, but yeast seemed to be of use only as a preventive.

A. D. B.

YANG (C. S.) & HU (C. K.). **The Relation of Pellagra to Enteric Disease. Report of Three Cases.**—*Nat. Med. Jl. China.* 1930. Oct. Vol. 16. No. 5. pp. 625–632. With 3 figs. on 2 plates. [18 refs.] [Peiping Union Med. College, Peking.]

Many cases of pellagra following organic disease of the gastro-intestinal tract have been recorded. Pellagra is a rare disease in China (only 10 cases have been reported in detail) and the authors record three cases. In two, pellagra was associated with dysentery, and in one, with tuberculosis of the intestine.

Case 1—male—aged 42—vegetarian.—He was admitted to hospital after having had diarrhoea for one year (the condition started with acute dysentery). Six months after the commencement of the diarrhoea, a rash appeared. On examination, the case proved to be typical pellagra with signs of nervous involvement of the legs and anaemia. A diet of eggs, meat, milk and tomato juice brought considerable improvement.

Case 2—female—aged 14—suffering from tuberculosis of the lungs, glands and intestine. The diet was poor, consisting chiefly of cereals. About two weeks after the onset of diarrhoea, the skin lesions of pellagra appeared.

Case 3—male—aged 24.—The patient lived on a diet of corn, wheat, millet, green and salted vegetables. Meat and eggs were not obtainable. He was admitted as a case of amoebic dysentery of over three years' duration. Cutaneous lesions were first noticed about two years and eight months after the onset of diarrhoea. Anti-dysenteric treatment with the addition of milk and tomato juice caused considerable improvement, but later the patient died of peritonitis, following rupture of one of the intestinal ulcers.

These three cases show that pellagra may follow lesions causing chronic diarrhoea, with associated interference with digestion and absorption, especially when the patient has been living upon a defective diet.

A. D. B.

TAKAHASHI (Sh.), ISHIKAWA (K.), OGAWA (Sh.) & IDA (T.). Pellagra und Pseudopellagra in Hokkaido. [**Pellagra and Pseudo-Pellagra in Hokkaido.**]—*Japanese Jl. Dermat. & Urol.* 1929. Oct. Vol. 29. No. 10. pp. 65–67. [Dermat.-Urol. Clinic, & I & II Med. Clinics, Imperial Univ., Hokkaido.]

The authors state that over 70 cases of pellagra have been recorded in Japan. From Hokkaido 4 cases are here reported.

Case 1—female—aged 54.—Following medical advice she lived on a light diet for three years previous to the appearance of the cutaneous symptoms of pellagra. The case was a typical one and was markedly improved by vitamin B therapy (beriberol).

Case 2—female—aged 45.—Pellagra developed associated with carcinoma of the pylorus. The symptoms of the former condition were improved by giving vitamin B in the form of wheat extract.

Case 3—male—aged 43.—All his life was liable to gastric disturbances. In this case both cutaneous and nervous manifestations were prominent. He improved rapidly with beriberol and oryzanin.

Case 4—female—aged 41.—Pellagra developed after prolonged gastro-intestinal trouble, complicated by under nourishment, due to an edentulous condition. Improvement accompanied the administration of vitamin B.

In all the above cases various haematological and biochemical tests were carried out, but there was nothing unusual in the findings.

A. D. B.

GEORGI (F.) & BEYER (A.). Zur Klinik und Genese der Pellagra. [**Etiology and Pathogenesis of Pellagra.**]—*Monatsschr. f. Psychiatrie u. Neurol.* 1930. Aug. Vol. 76. No. 5/6. pp. 296–355. With 6 text figs., 1 folding chart & 2 coloured plates. [32 refs.] [Psychiat. & Nerve Clinic, Univ., Breslau.]

Pellagra is on the increase in Germany since the War. The authors describe 13 cases (one in great detail) which were seen in their clinic in Breslau. The first case is that of a young girl who had been under observation previously for mental symptoms, associated with (?) early organic nerve disease and epileptiform attacks. It is interesting to note that typical pellagra symptoms occurred after the onset of the mental condition, and the opinion is given that the latter was, in reality, the earliest manifestation of the former. The case ended fatally after two years' duration.

The next five cases were similar in most respects to the above, in that what is regarded as a pellagra psychosis ushered in the clinical picture. In two further cases it was doubtful whether the initial mental symptoms were really pellagrous or not. The remaining five cases, though again the mental symptoms constituted the first abnormality noticed, are certainly to be regarded as merely cases of pellagra supervening upon a schizophrenic mental state.

[This is a truly enormous paper, but from the point of view of pellagra research there is little, save the above, to note.]

A. D. B.

MUNFORD (S. A.). **Pellagra, incident to Reduction Diet.**—*Clifton Med. Bull.* 1930. July. Vol. 16. No. 3. pp. 113–115.

In the U.S.A. pellagra is rare north of the Potomac and Ohio rivers. Three cases are here recorded, of which one subject lived in Delaware, and two in New York.

Case 1—female—aged 38—admitted to hospital in a stuperose condition on June 18th, 1925. The history was that following the dictates of a faddist cult, she lived on a diet of raw carrots, raw beets, artichokes, alligator pears, celery, lettuce, grapefruit and crackers. "After four months of this, another cut was made and the total permitted in a day was two leaves of lettuce, one stalk of celery, and two crackers in the morning, and again in the evening." After about two months of this diet, she developed dermatitis (resembling sunburn) on the hands, fore-arms, and round the mouth, together with diarrhoea and mental apathy. Her weight was 110 lbs., and a secondary anaemia was present. At first she was forcibly fed, but later took food well, and by September 6th, 1925, was perfectly well and was discharged from hospital. In June, 1926, she weighed 170 lbs.

A. D. B.

REED (Alfred C.). **Pellagra. Four Case Reports from San Francisco.**—*Amer. Jl. Trop. Med.* 1930. Sept. Vol. 10. No. 5. pp. 335–343. [Pacific Inst. of Trop. Med., Univ. of California, San Francisco.]

Pellagra occurs sporadically in California, but many cases in the State are imported. Thus for the years 1919 to 1927 inclusive, the incidence figures were 0, 16, 21, 32, 42, 38, 63, 58, 45 respectively. HEIN and MERRILL remark upon the predisposing influence of alcohol and gastro-intestinal disease and upon the fact that the majority of the cases are Irish.

The etiology, pathology, prognosis, diagnosis and treatment are discussed. Under the last heading, liver or liver extract is mentioned as being worthy of trial. Four cases are described in detail, but a brief summary of three will suffice.

Case 2—female—Mexican—aged 49.—Has lived for 19 years in San Francisco. About a year ago following removal of teeth and tonsils, diarrhoea began followed by a typical dermatitis later. All the usual findings were present, but vaginitis and vulvitis were troublesome features. Treatment consisted in giving a high protein diet and cacodylate intravenously. Later, Harris yeast extract tablets were exhibited. Two months after admission to hospital, her condition had returned to normal.

Case 3—male—aged 70—White.—Symptoms began about two months ago, with diarrhoea, dermatitis and sore tongue. For the last three or four years he has been a beggar, and his diet has consisted chiefly of doughnuts, coffee and soup. Clinically, he presented a typical picture of pellagra. After being on a high protein diet for a month, the dermatitis had almost disappeared and his dementia was considerably improved.

Case 4—male—native of Peru—aged 58.—For a "long time" his diet had consisted solely of macaroni, rice and baked beans. He had lived in San Francisco for 38 years, and about four months previous to admission to hospital, his present illness began with diarrhoea and paraesthesiae. The case was typical, but was complicated by syphilis. Anti-luetic treatment, with high protein diet and yeast, brought about a gradual improvement in his condition.

A. D. B.

SWARUP (Anand). **A Case of Pellagra.**—*Indian Med. Gaz.* 1930. Aug. Vol. 65. No. 8. pp. 440–441. With 1 text fig.

Pellagra is a comparatively rare disease in India. The present case came from the Ballia District of the United Provinces. The patient, a native,

male, age 31, was admitted to the District Hospital in February 1930. There was a history of dermatitis and stomatitis, occurring in the spring, and on one occasion an attack of diarrhoea. On admission, the face, hands, arms, legs and feet showed a fairly characteristic dermatitis, a not quite typical glossitis, and erosions at the angles of the mouth. The appetite was good and the bowels were normal. A definite tremor of the tongue was present, and the patient complained of sleeplessness, vertigo, and vague pains all over the body. Maize was eaten on only rare occasions, and it was unusual for him to take fish or meat. For a time, the exhibition of Fowler's solution seemed of benefit.

A. D. B.

LENGSFELD (W.). Ein Fall von Pellagra beim Kind. [**Pellagra in a Child.**] —*Jahrb. f. Kinderheilk.* 1930. Mar. Vol. 127. (3rd Ser. Vol. 77.) No. 1/2. pp. 69–82. With 1 coloured plate. [15 refs.] [Children's Clinic, Univ., Breslau.]

A case of pellagra is described in a child of six from Silesia. For some time the patient had lived upon a protein-poor diet and since the age of two had suffered from the effects of malnutrition. From the photographs the case appears to be a typical one of pellagra. In spite of temporary improvement on a regulated diet, the child fell a victim to an intercurrent infection and died. As evidence of the presence of an avitaminosis, it is interesting to note that keratomalacia was present just before death.

A. D. B.

JAENSCH (P. A.). Augenerkrankungen und Pellagra. [**Eye Diseases and Pellagra.**]—*Monatsschr. f. Psychiatrie u. Neurol.* 1930. Aug. Vol. 76. No. 5/6. pp. 355–363. [11 refs.] [Univ. Eye Clinic, Breslau.]

An historical survey of the subject reveals that many eye conditions are met with in cases of pellagra, but there is little, if anything, to show that there is any connexion.

The author had the opportunity of examining the pellagrins described by GEORGI and BEYER (see above). Of this series, four only showed alterations in the eye, though a very slight conjunctivitis was noticed in some. The four eye conditions found were glaucoma, pallor of the optic discs, retrobulbar neuritis, with central scotoma, and (?) early optic neuritis. Even here, however, the author cannot positively assert that there is any direct connexion between these eye conditions and pellagra.

A. D. B.

GREER (Alvis E.). **Pellagra-like Skin Lesions due to the Ketogenic Diet.**—*Jl. Amer. Med. Assoc.* 1930. Sept. 20. Vol. 95. No. 12. p. 863. [9 refs.] [Greer-Park Clinic, Houston, Texas.]

The patient, a female, aged 33, was a sufferer from idiopathic epilepsy. On July 17th, 1929, she was placed upon a ketogenic diet, in addition to phenobarbital and bromide. She received protein 36 gm., carbohydrate 36 gm. and fat 238 gm. per diem, given in the form of oatmeal, cream, butter, mayonnaise, 5 per cent. vegetables, 10 per cent. fruits and bacon. On this diet, the patient developed ketosis and her condition improved markedly, but, on October 25th 1929, a pellagra eruption and sore tongue appeared. In spite of this she still continued with the diet and the dermatitis persisted. On December 3rd one drachm of brewers' yeast was given with no other dietary alteration. After two weeks the skin symptoms had practically disappeared.

The author is of the opinion that care should be taken to ensure that patients upon a ketogenic diet receive a more liberal protein allowance than the usual 1 gm. per kilogram of body weight. He agrees with McQuarrie that 1·75–2 gm. of protein is probably necessary. The patient here considered received an amount a little less than ·8 gm. of protein per kilogram of body weight. The pellagra-like skin symptoms were thought to be due to the protein deficiency.

A. D. B.

Guthrie (Riley H.). **Pellagra-like Skin Lesions appearing in the Course of a Ketogenic Diet.**—*Jl. Amer. Med. Assoc.* 1930. Dec. 20. Vol. 95. No. 25. pp. 1912–1913.

This case is almost identical with that described by Dr. Greer (see above). The patient, a single woman aged 30, had suffered from epilepsy for some years. Treatment proving unsuccessful, she was placed upon a ketogenic diet with a very low protein content, relatively liberal carbohydrate, and a high fat allowance. Large doses of phenobarbital were also given. After 7 months of this diet the patient developed a pellagra-like dermatitis on the hands and neck. Various nervous symptoms were present, but these may have been due to the phenobarbital. The skin manifestations began to subside as soon as the diet restrictions were removed.

A. D. B.

Susman (William). **Morbid Anatomy and Histology of Pellagra.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1930. June 30. Vol. 24. No. 1. pp. 23–28. With 8 figs. on 4 plates. [8 refs.] [Path. Dept., Victoria Univ., Manchester.]

A certain number of observers have, for some time, held the view that pellagra is associated with an endocrine disturbance. Watson, in 1925, showed that the degeneration in the cortical cells of pellagrins was similar to that occurring in cases of myxoedema, and Roaf (1920) found atrophy of the suprarenals in some cases. The present paper deals with the morbid anatomy and histology of pellagra, particularly from this point of view. Six cases (2 sub-acute and 4 chronic) were examined. The author was allowed also to investigate sections of 17 other cases, and the findings agreed with his own.

In the alimentary tract, atrophy and often catarrhal changes were found. The liver in 3 chronic cases showed fibrosis with areas of degeneration and round cell infiltration. (Of the 2 sub-acute cases, one was practically normal and the other presented marked fatty infiltration.) The pancreas, in all six cases, showed acinar atrophy, and almost total absence of zymogen granules; in several, there was hyperplasia of the reticular endothelium, and in nearly all, the islets were abundant, with haemorrhages in some. The pars nervosa of the pituitary gland in three of the four cases was the seat of haemorrhages, and in one case there was an adenoma of the pars anterior. The spleen showed hyperplasia and congestion.

While the parathyroids (one case) showed no abnormality, very definite changes were found in the thyroid gland. In the four chronic cases there was pronounced fibrosis, with progressive obliteration of the vesicles. Round-cell infiltration was slight. Of the two sub-acute cases, one presented a gland almost entirely composed of spheroidal cell masses with some fibrosis, and scarcely any vesicles, and the other showed a similar condition with masses of very large cells. In both, the glands had been completely disorganized.

In all (five cases) the suprarenals had a scanty, or absent, lipoid and in the cortex there were disorganization, scars and regenerated nodules. The medulla, however, appeared normal.

In two chronic cases, the kidneys showed general fibrosis with, in one, intra- and peri-tubal masses resembling calcified material, and in the other, with multinucleated cells in or around the tubules. The sub-acute cases presented swelling of the glomeruli, atrophy of the tubules and some regeneration.

The skin sections showed loss of epidermis in parts with absence of malpighian papillae, thickening of the keratinized layer, and round celled infiltration in some cases. There was evidence of degeneration in various tracts of the spinal cord, and in the brain the cortical pyramidal cells, the Purkinjé cells and ganglion cells of the mid-brain showed acute degeneration, together with gliosis and a deposit of perivascular pigment.

The author stresses the abnormality of the thyroid in every case, and the appearances suggest not an inflammatory process of ordinary type, but the presence of a toxin, or toxin-producing organism, of a low grade of virulence. " The process suggested is a primary disturbance in the thyroid, which gives rise on the one hand to a disturbed digestive mechanism, and on the other hand to a maladjustment of the endocrines, and also, of the liver from its glycogenic aspect. The endogenous toxins so liberated can account for the lesions in the kidneys, the skin, and the central nervous system."

There is some evidence to show that a minute anaerobic organism, described by the author in 1927, may be the cause of the above lesions. [See this *Bulletin*, Vol. 24, p. 808]. It is doubtful whether dietetic causes alone can be responsible for the pathological findings in pellagra. Possibly both factors act in conjunction.

The paper is well illustrated with microphotographs.

A. D. B.

GLAUBERSOHN (S. A.) & GOLDENBERG (M. M.). Zur Lehre ueber die Photodermatosen. [**Light Dermatoses.**]—*Dermat. Woch.* 1930. Nov. 1. Vol. 91. No. 44. pp. 1625–1632. With 6 text figs.

There are in the body substances which render the skin sensitive to the action of light ; these may be either exogenous or endogenous. The author describes four cases bearing on this subject :—

Case 1—female—aged 34—10 years history of skin eruption appearing in the spring, advancing in the summer, and disappearing in the winter. This eruption was of a papular nature and was noted on the face, hands and forearms. The blood showed some anaemia and, spectroscopically, haematoporphyrin in the serum and erythrocytes. Haematoporphyrin was also discovered in the urine.

Cases 2 *and* 3—mother and daughter—aged 47 and 16, respectively. The daughter at the age of 11 began to have a papular dermatitis on the face and hands, which has recurred every spring and summer ever since. The mother had a similar condition dating from the age of 16. In neither case was the general health impaired and there was no stomatitis. Haematoporphyrin was not examined for in either case.

A consideration of all the findings in these three cases leads the authors to the conclusion that the condition is one of " summer prurigo," which is briefly contrasted with a case of " eczema solare."

A further case of urticaria solaris is described. The authors claim that the four types of light dermatoses are related ; that one long exposure to sunlight may sensitize the patient permanently ; and that the probable cause of the conditions is the presence of a photodynamic substance, haematoporphyrin or another.

A. D. B.

WILSON (J. Frank). **Arsphenamine in the Treatment of Pellagra: Report of One Hundred Cases.**—*Southern Med. Jl.* 1930. Aug. Vol. 23. No. 8. pp. 758–762. [4 refs.]

This paper is based upon experience gained during the last five years in the Dermatological Department of the Jacksonville City Dispensary, Florida, and in the Out-patient Department of the Duval County Hospital. More than 200 cases of pellagra were treated during this period but, for the present purpose, only 100 are analysed. In order to assess the value of the results, it must be remembered that only ambulatory cases are here recorded, as the more serious ones, being sent to hospital, were lost sight of.

In addition to weekly injections of arsphenamine, tonics were given and instructions as to diet. The poor co-operation of the patients in the matter of diet renders the good result of the injections all the more noteworthy. Equally satisfactory results were obtained whether arsphenamine, neoarsphenamine or sulpharsphenamine were used. The majority of the patients received between two and six doses. The ordinary type of case, as seen by the general practitioner, responded well ; even after the first dose the appetite and digestion improve and the diarrhoea ceases.

In a table showing the result of the treatment in 100 cases, it is seen that 85 per cent. became symptom-free. (The author regards 61 per cent. of this group as " improved," since they were unable to change their surroundings and were therefore liable to recurrence) ; 5 per cent. were unimproved, 5 per cent. died and 5 per cent. were lost sight of. Some of the cases are described in detail, and showed the great benefit derived from arsphenamine. In one family, all the members, children and adults, suffered from pellagra. All received dietary treatment, and all, except the father, received three doses of arsphenamine. In a comparatively short time, all but the father were completely well. The father (who had one injection), and a child (who had no injection) from a neighbouring house, received the same diet as the others, but showed no improvement.

A. D. B.

WHEELER (G. A.). **Black Tongue in Dogs and its Relation to Pellagra in the Human.**—*Jl. Amer. Vet. Med. Assoc.* 1930. July. Vol. 77. No. 1. pp. 62–72.

Canine blacktongue and pellagra are regarded as one and the same disease on account of their seasonal and geographical incidence ; their common cause and similar course ; their identical pathological changes and their equal response to the same therapeutic and preventive measures.

In 1907 CHITTENDEN observed that a dog deprived of meat and milk fell sick with certain definite symptoms and, in 1917, this author, with

UNDERHILL, produced a pathological condition in dogs by feeding them upon boiled peas, cracker meal and cottonseed oil. In both the above experiments there was noted a similarity between these findings and the disease occurring naturally among dogs in the Southern States and known as blacktongue. In experimental blacktongue a scrotal dermatitis appeared in about 50 per cent. of the attacks, a phenomenon which had not been generally noted in the spontaneous disease. It will be remembered that in the experimental production of pellagra in the human subject in the Mississippi State Penitentiary, all the cases showed initial skin lesions on the scrotum. (The other symptoms of blacktongue need not be further detailed, as they have been described previously, this *Bulletin*, Vol. 25, pp. 445, 885–6.)

"It has been found that milk (including buttermilk), fresh lean meats, liver, dried yeast, canned salmon, and wheat germ are highly effective as preventives of both blacktongue and pellagra. Dry skim-milk, tomato-juice, cowpeas, English peas, eggs, canned haddock and whole wheat products furnish somewhat less, but appreciable protection; Soy beans, carrots, and rutabaga turnips furnish very little; and corn products, molasses or sugar, butter, cod-liver oil, cottonseed oil, salt pork, pork fat, sweet potatoes and onions are practically without detectable value as protection against either disease."

The above substances having a fair preventive value have also a favourable therapeutic effect, but the best single substance, in this respect, is pure dried yeast in a daily dose of ½ to 1-oz.; highly satisfactory results being obtained in both diseases. Of course, since both blacktongue and pellagra are the result of faulty diet, this should be corrected immediately.

A. D. B.

GOLDBERGER (Joseph), WHEELER (G. A.), ROGERS (L. M.) & SEBRELL (W. H.). **A Study of the Blacktongue Preventive Value of Lard, Salt Pork, Dried Green Peas, and Canned Haddock.**—*Public Health Rep.* 1930. June 6. Vol. 45. No. 23. pp. 1297–1308. [8 refs.]

This is a continuation of the work in which staple foodstuffs are tested in respect of their potency as preventives of canine blacktongue. The value of this anti-blacktongue factor is assumed to be the same for pellagra. Lard, salt pork and dried green peas are found to be poor sources of this factor, while canned haddock is fairly potent. "Fifty per cent. or more of the test animals on the lard, salt pork and haddock diets showed post-mortem evidence of fatty degeneration of the liver."

A. D. B.

GOLDBERGER (Joseph) & SEBRELL (W. H.). **The Blacktongue Preventive Value of Minot's Liver Extract.**—*Public Health Rep.* 1930. Dec. 12. Vol. 45. No. 50. pp. 3064–3070. [7 refs.]

Dogs fed on a diet consisting of corn meal, cowpeas, casein, cottonseed oil, cod-liver oil and salt mixture develop blacktongue in a period which only occasionally exceeds 53 days. Five dogs on this diet were given liver extract in amount equivalent to 100 grams of fresh liver, and the appearance of blacktongue was prevented for at least 185 days. On discontinuing the liver extract, in three of the dogs symptoms of the disease were noted in 54, 228 and 52 days, respectively.

On the therapeutic side it was found that the same dose of liver extract administered to animals already suffering from blacktongue " caused a recession of symptoms in four out of five dogs and prevented a recurrence, except for possible fleeting signs in two animals, for at least 140 days." It appears, therefore, that liver extract is fairly rich in anti-pellagra vitamin and should prove of value in treatment.

A. D. B.

RODRIGUEZ (José N.). **Pellagra in the Philippines.**—*Jl. Philippine Islands Med. Assoc.* 1930. May. Vol. 10. No. 5. pp. 217–221. With 1 fig. [7 refs.]

A second case of pellagra in the Philippine Islands is here described, the first having been reported by WILLETS in 1910.

A. D. B.

RILLE (J. H.). Die Hauterscheinungen der Pellagra. [**Skin Manifestations in Pellagra.**]—*Dermat. Ztschr.* 1930. June. Vol. 58. No. 5/6. pp. 305–312. [Skin Clinic, Univ., Leipzig.]

This is a clinical lecture given to the Berlin Dermatological Society, and apparently is merely a résumé of the subject without recent original work.

A. D. B.

CARRANCÁ TRUJILLO (R.). La pelagra como enfermedad de carencia.—*Rev. Méd. Barcelona.* 1929. July. Year 6. Vol. 12. No. 67. pp. 56–59. [2 refs.]

WHEELER (G. A.). The Prevention of Pellagra.—*Southern Med. Jl.* 1930. Apr. Vol. 23. No. 4. pp. 299–304. [17 refs.]

TROPICAL OPHTHALMOLOGY: A REVIEW OF RECENT ARTICLES.—XV.*

EYELIDS.—SAWHNEY[1] was consulted by a child aged 5 on account of a redness of the eye. Examination showed moderate conjunctival inflammation and a small, hard swelling situated just external to the side of the lachrymal sac. On separating the lids a thorn an inch long was found projecting from a mass of granulation tissue in the neighbourhood of the caruncle. The thorn had been embedded in the tissues for five months, and, despite the position of its free extremity beneath the upper lid, had caused remarkably little pain or inconvenience.

CONJUNCTIVA.—*Trachoma.*—N. Bishop HARMAN[2] chose trachoma as the subject of his opening address to the Ophthalmological Section of the British Medical Association at Winnipeg. His review of the subject pointed to the fact that the disease now only flourishes in those countries where squalor and bad social conditions exist. The elementary school, which furnishes education in personal hygiene, is the most efficient prophylactic against contagious eye disease. Bishop Harman considers that pannus rarely occurs during the first year of the disease in children, and that it may never appear if efficient treatment is instituted at an early date. He is inclined to the view that the worst end-results are sometimes due more to ill-advised severity of treatment than to the effects of the disease. He states "there is no doubt that if we could keep the children of one generation free from the disease, trachoma would be extinct."

WEISS,[3] reviewing existing opinions regarding trachoma, considers the specific nature of NOGUCHI'S "*Bacillus granulosis*" still unproved. The aetiological problem presented by the disease is one of the most difficult in the whole field of bacteriology. He discusses the possibility that trachoma may be the local manifestation of a general constitutional derangement. The fact that ophthalmologists disagree about the clinical and pathological definition of the early stages adds to the difficulty. "Evidently it will be impossible to define it properly until the exact etiology, not only of trachoma, but also of those other conjunctival diseases that are being confused with trachoma, is known." The same author[4] describes the inconclusive results of inoculation of *Bacillus granulosis* made by him on monkeys. TILDEN and TYLER[5] record their observations on some of the strains of the *Bacillus granulosis* isolated by NOGUCHI in 1926. Some of the animals described in Noguchi's monograph are still alive and continue to show granular

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* For the fourteenth of this series see Vol. 27, pp. 1010–1016.

1 SAWHNEY (M. R.). Report on a Case of a Thorn under the Upper Lid.—*Brit. Jl. Ophthalm.* 1930. Mar. Vol. 14. No. 3. pp. 115–116.

2 HARMAN (N. Bishop). Observations on the Control of Trachoma.—*Brit. Med. Jl.* 1930. Sept. 20. pp. 457–460. [17 refs.]

3 WEISS (Charles). Present Knowledge of the Etiology of Trachoma.—*Jl. Infect. Dis.* 1930. Aug. Vol. 47. No. 2. pp. 107–129. [85 refs.] [Med. School, Washington Univ., St. Louis.]

4 WEISS (Charles). Studies on *Bacterium granulosis* in Relation to Trachoma: Pathogenicity for Various Monkeys and Apes.—*Proc. Soc. Experim. Biol. & Med.* 1931. Jan. Vol. 28. No. 4. pp. 398–401. [9 refs.] [Med. School, Washington Univ., St. Louis, Mo.]

5 TILDEN (E. B.) & TYLER (J. R.). *Bacterium granulosis* in Relation to Trachoma: its Recovery from Experimentally Infected Monkeys and from Human Trachoma.—*Jl. Experim. Med.* 1930. Oct. 1. Vol. 52. No. 4. pp. 617–635. With 5 coloured figs. on 1 plate. [11 refs.] [Rockefeller Inst. for Med. Research, New York.]

lesions. Cultures of Noguchi's strain have been recovered from the monkeys as late as 3 years after inoculation and have reproduced the granular disease in other monkeys. Cultures of the bacteria kept in semi-solid medium containing 10 per cent. rabbit serum (" Leptospira medium ") remained viable for many months at room temperature. It is noteworthy that cocaine has a bactericidal effect on the micro-organism. It is suggested that this may explain the negative results reported by some workers.

BEIGLEMAN[6] advocates tarsectomy in the treatment of trachoma. He claims that it relieves the injurious pressure of the eyelid on the cornea and prevents entropion. It is indicated once corneal complications or entropion have set in ; but it should not be performed in the early stages of the disease. The author removes the tarsal plate through an incision made in the skin of the lid.

The *Revue Internationale du Trachome* for October 1930 contains an article by K. OLITSKY[7] on the relation of the *B. granulosis* to trachoma. The author stresses the following points : (1) That the newly described organism has hitherto only been found in human or in experimental trachoma ; (2) that it is capable of producing in monkeys and apes a chronic granular conjunctivitis which closely resembles human trachoma ; (3) that material obtained from human trachoma causes a similar disease in these experimental animals, and that the bacterium can be recovered from the monkey so infected ; (4) that this experimental conjunctival inflammation differs from the spontaneous folliculosis to which monkeys are subject ; (5) that competent ophthalmologists have considered the inoculated disease to be trachoma. An interesting characteristic of the micro-organism is that it is killed in five minutes by a 4 per cent. solution of cocaine.

ADDARIO[8] succeeded in inducing the disease by inoculating one eye of a blind man with culture of *B. granulosis* obtained from the Rockefeller Institute in New York. The uninoculated eye reacted in eight days time, and trachoma became fully established in both eyes at the end of ten months.

MORAX[9] records PROCTOR'S description of the experimental inoculation of human subjects with *B. granulosis*. Dr. Richards was one of the volunteers and a lady belonging to the Bacteriological Department was another. Transient signs only of the disease were produced. MORAX suggests that persons already blind might volunteer for the inoculation if they knew there was a demand for such subjects.

Another aspect of the disease is reviewed by PASCHEFF.[10] He approaches the question from the anatomical and histological side and describes the various forms of chronic hyperplasia of the conjunctiva met with, viz. : plasma cell, lymphocytic, follicular with many sub-

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6 BEIGLEMAN (M.). Simple Tarsectomy : its Indications and Technique.—*Amer. Jl. Ophthalm.* 1930. Aug. Vol. 13. No. 8. pp. 677–680. With 3 text figs. [16 refs.]

7 OLITSKY (Peter K.). Relation of *Bacterium granulosis* to Trachoma.—*Rev. Internat. du Trachome.* 1930. Oct. Vol. 7. No. 4. pp. 173–187. [20 refs.] [Rockefeller Inst. for Med. Research, New York.]

8 ADDARIO. Sul valore etiologico del *Bacterium* granulosis di Noguchi : tracoma sperimentale.—*Rev. Internat. du Trachome.* 1931. Jan. Vol. 8. No. 1. pp. 14–19. With 2 text figs. French summary.

9 MORAX (V.). L'inoculation du *Bacterium granulosis* (Noguchi) à l'homme.—*Rev. Internat. du Trachome.* 1931. Jan. Vol. 8. No. 1. pp. 23–27.

10 PASCHEFF. Les hyperplasies chroniques de la conjonctive et le vrai trachome.—*Rev. Internat. du Trachome.* 1930. Oct. Vol. 7. No. 4. pp. 189–199. With 1 text fig. [16 refs.]

varieties, papillary and hyaline. He urges the need to unify our conception of the nature of true trachoma. J. SÉDAN[11] contributes a paper dealing with phlyctenular disease in trachomatous subjects. He states that trachoma, even in the cicatricial stage, aggravates phlyctenular disease and renders it more resistant to treatment. He has found yellow oxide of mercury ointment to be positively injurious in this type of disease. [It is worth noting that appropriate constitutional treatment directed to cure phlyctenular disease, combined with attention to naso-pharyngeal catarrh and dental sepsis, and with the use of such applications to the eyes as are non-irritating and likely to protect the skin of the eyelids, may sometimes lead to the cure of an apparent trachoma.]

In the issue of January 1931 MORAX[12] describes his observations made during a tour in Algeria which he undertook at the instance of the Anti-Trachoma League. He is convinced of the importance of infantile infection from the mother in the home ; indeed, he considers school infection to be a mild factor in comparison. Scholars coming from well-to-do homes seldom contract the disease. Special attention, therefore, should be given to the ophthalmological inspection of mothers and such of their young daughters as have care of infants. Those in charge of schools must be taught the elementary principles concerning the detection and simple treatment of trachoma ; and schools must be inspected at regular intervals by qualified persons.

Other articles deal with the disease in Tunisia and Indo-China.

LACHRYMAL SAC.—*Dacryocystitis due to Myiasis.*—FALCÃO[13] reports a case of suppurative dacryocystitis associated with fistula in which the cause was found to be a larva of *Dermatobia cyaniventris*. He dealt with the trouble by enlarging the opening and inserting a small pledget of cotton wool well soaked in hydrogen peroxide. After waiting for two minutes he was able to extract the larva with iris forceps. He reviews other recorded cases of this larval infection.

CORNEA.—*Superficial Punctate Keratitis.*—R. E. WRIGHT[14] has published some further observations on the epidemic which occurred in Madras in recent years. This epidemic reached its highest point in October 1929 and subsided in February 1930. The incubation period seemed to range between one week and thirty-four days. No immunity against a second attack of the disease was acquired. Enlargement of the preauricular gland was found in a small percentage of cases. Dionine in the late stages, and in the early stages atropin with occlusion by a wet pad and bandage, was found the most suitable treatment.

CATARACT.—KIRBY[15] has made an exhaustive study of calcium metabolism in cases of senile cataract. A considerable number of patients (apparently over 130) were examined, and the author was

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11 SÉDAN (Jean). De la kératite phlycténulaire chez les trachomateux.—*Rev. Internat. du Trachome.* 1930. Oct. Vol. 7. No. 4. pp. 203–210. [4 refs.]

12 MORAX (V.). L'organisation de la lutte contre le trachome en Algérie.—*Rev. Internat. du Trachome.* 1931. Jan. Vol. 8. No. 1. pp. 1–14. [2 refs.]

13 FALCÃO (Edgard de Cerqueira). Considerações acerca das ophtalmomyiases determinadas pela "Dermatobia cyaniventris"–Macquart–1840.—*Brasil-Medico.* 1929. Sept. 21. Vol. 43. No. 38. pp. 1134–1138. [10 refs.]

14 WRIGHT (R. E.). Superficial Punctate Keratitis.—*Brit. Jl. Ophthalm.* 1930. Vol. 14. No. 11. pp. 595–601. With 1 chart in text.

15 KIRBY. A Study of Calcium in Relation to Cataract.—*Trans. Amer. Acad. Ophthalm. & Oto-Laryngology.* 1930. Pressional Vol. pp. 89–133. [29 refs.]

unable to find any evidence of calcium excess or deficiency in their blood. The administration of parathyroid extract appeared to have no beneficial effect. The general trend of Kirby's investigation suggests that the development of senile cataract is not due to a disturbance of calcium metabolism. [It may be mentioned that some observers in India have remarked that those districts which show an abnormal prevalence of vesical calculus often show an excessive incidence of senile cataract also.]

ELLIOT[16] has recorded his experience of operation for cataract on patients of very advanced age, and has noted how well such patients stand the shock of an operation. He considers that the extraordinary vitality that enabled them to live so far beyond the usual span of life renders them exceptionally good subjects for operation. He has noted that these patients usually have warm hands and feet, indicating an active thermotaxic centre and good circulation. In short, some patients of over 90 years of age are better subjects for cataract extraction than many who are only in the 6th and 7th decades of life.

O'MALLEY,[17] in view of his experience at the Clinic of Mathra Das, pleads for an extended use of the intra-capsular operation by European surgeons. He describes the technique employed at the Clinic. This is practically the same as that advocated by SMITH, but no counter-pressure is employed. The lens is in every case "tumbled." If difficulty is found in delivery the writer considers it better to rupture the capsule rather than to use counter-pressure. He was able to show a very small percentage of vitreous loss, namely 3 in 220 operations.

WRIGHT[18] regards O'Brien's method of inducing paresis of the orbicularis, by injecting novocaine and adrenalin in the neighbourhood of the temporomandibular joint (*vide* this *Bulletin*, Vol. 27, No. 6, p. 504), as the best so far devised for this purpose.

GLAUCOMA.—WRIGHT and Koman NAYAR[19] report four cases of buphthalmos in brothers varying in age from 15 to 26 years. Two of these had been trephined in one eye some four years previously. The sight of the trephined eyes had been preserved whilst the unoperated eyes had deteriorated. They consider that trephining affords a better prospect in this class of case than any other form of treatment.

GENERAL.—MOORE[20] has noted an *amblyopic condition in school children* which he attributes to a defect of some food factor in the diet. The fields of vision are nearly normal except for a slight contraction of the temporal field. No scotoma was noted. In one case there appeared to be a definite neuritis, but there were practically no other objective signs except some slight corneal changes.

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16 ELLIOT (R. H.). Cataract Operation in Extreme Old Age.—*Brit. Med. Jl.* 1931. Jan. 24. pp. 132–133.

17 O'MALLEY (C. Conor). Intra-Capsular Cataract Extraction at Moga, Punjab. —*Brit. Jl. Ophthalm.* 1931. Mar. Vol. 15. No. 3. pp. 153–160. [4 refs.]

18 WRIGHT (R. E.). Akinesia during Extraction of Cataract.—*Arch. Ophthalmology.* 1929. Dec. N.S.2. Vol. 2. p. 691. [2 refs.]

19 WRIGHT (R. E.) & NAYAR (K. Koman). Trephining in the Treatment of Congenital Glaucoma.—*Brit. Jl. Ophthalm.* 1931. Mar. Vol. 15. No. 3. pp. 166–170.

20 MOORE (D. G. F.). Partial Loss of Central Acuity of Vision for Reading and for Distance in School Children and its Possible Association with Food Deficiency.—*West African Med. Jl.* Lagos. 1930. Oct. Vol. 4. No. 2. pp. 46–48.

WRIGHT[21] has found the application of a wire snare to the globe to be a useful addition to the *technique of enucleation* when it is desired to perform any modification of Mules' operation. After the globe has been carefully cleaned the snare is applied and the tissue pedicle is cut through by tightening the wire. The procedure renders complete the exposure of a clean and dry Tenon's capsule.

Anaesthesia.—MORGAN and LEES[22] report their experience of Avertin. This drug is tribromethyl alcohol, which forms with distilled water a relatively stable solution of about 3 per cent. at a temperature between 35° and 40° C. If heated beyond 40° it decomposes and becomes highly irritant as hydrobromic acid is split off and dibromacetaldehyde is produced. The dosage works out to between 0·06 and 0·09 grams per kilo of body weight. Highly excitable or bull-necked patients require a larger proportionate dose than phlegmatic or spare subjects. The procedure adopted was that suggested by Messrs. Bayer in their handbook. One hour before operation an injection of morphia and atropin is given. [It is probably wiser to omit the morphia as avertin has a depressing effect upon the respiratory centre.] Half an hour before operation the calculated amount of avertin is given by rectal tube. *The temperature of this solution must not exceed 40° C.* Immediately before injection this solution is tested by the addition of 2 drops of 1–1,000 congo red solution to 5 cc. of the avertin solution. Any blue colouration shows decomposition, and the solution must be discarded. The injection occupies 5 to 10 minutes. Should this injection be returned, it must not be repeated for at least four hours, since absorption of the drug is very rapid. Narcosis usually lasts from 1½ to 2 hours. Absolute amnesia follows, and this secures an absence of mental anxiety and consequent shock. Deficient function of the kidneys or of the liver contraindicates the drug.

SHETTI[23] has described the conditions found at Bijapur eye hospital in the Bombay Presidency, and the methods of treatment in vogue at the Institution. Keratomalacia is a common trouble; instillations of cod-liver oil are given in addition to the usual treatment. Cataract extraction is performed either with or without capsulotomy according to the type of case; the outer canthus is usually divided in order to lessen the danger of squeezing. Intravenous injections of iodine are much used in the treatment of diseases of the retina and optic nerve. The solution injected is half a grain of potassium iodide and half a grain of iodine in 10 cc. of distilled water. A total of six injections is administered, an interval of three or four days being left between each injection.

Quinine Amblyopia.—DUGGAN and NANAVATI[24] report two cases of quinine amblyopia. The dosage in each was remarkably small—two and a half grains of the sulphate four times daily for a girl aged nine and two grains thrice daily for a man aged 20; the girl had only taken six doses, but the man had taken the drug for three weeks continuously. Both patients eventually recovered good central vision, but the visual

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21 WRIGHT (R. E.). The Use of a Snare in Enucleation of the Eyeball.—*Indian Med. Gaz.* 1930. Oct. Vol. 65. No. 10. pp. 550–551.

22 MORGAN (O. Gayer) & LEES (J. M.). Rectal Narcosis in Ophthalmic Surgery. —*Brit. Jl. Ophthalm.* 1930. Nov. Vol. 14. No. 11. pp. 577–582.

23 SHETTI (E. R.). Notes on the Treatment of Certain Eye Diseases.—*Jl. Trop. Med. & Hyg.* 1930. Oct. 15. Vol. 33. No. 20. pp. 305–306.

24 DUGGAN (J. N.) & NANAVATI (B. P.). Two Cases of Quinine Amblyopia with Unusual Ophthalmoscopic Picture.—*Brit. Jl. Ophthalm.* 1931. Mar. Vol. 15. No. 3. pp. 160–164. [3 refs.]

fields remained contracted concentrically. The treatment adopted was amyl nitrite inhalations, hydrobromic acid, hypodermics of strychnine with the administration of strong coffee and saline purgatives. The malaria was controlled by plasmochin. The authors suggest that in malarious countries some cases of optic atrophy, occurring without obvious cause, may be due to quinine poisoning.

REVIEWS.—*The Bulletin of the Ophthalmological Society of Egypt* for 1930 contains many papers which prove the active and progressive nature of the Society. PERETZ[25] describes the difficulties met with in operations on the Egyptian for senile cataract. The prevalence of trachoma in Egypt not only causes disappointment on account of corneal troubles, but also adds to the dangers of the operation by contracting the fornices and causing blepharophimosis. Glaucoma, too, is a common complication. BARRADA[26] describes a method of dispensing with the use of a speculum by using sutures to separate the lids. MEYERHOF[27] discusses a type of deep interstitial keratitis found in trachoma. EL-KATTAN[28] describes the histological appearances of corneae obtained from post-mortem room subjects in which the corneae appeared macroscopically healthy. Many of these showed cellular infiltration beneath Bowman's membrane. MASSOUD[29] records the result of an investigation regarding the differential leucocyte count in cases of eye disease. He concludes that a high mononuclear count appears to indicate the presence of some toxin acting on the reticular endothelial tissue. This toxin is likely to be particularly dangerous to the eye. In the presence of such a toxin the trauma of an operation might probably suffice to start an inflammatory process in an apparently healthy eye.

The Fourth Annual Report of the Giza Memorial Ophthalmic Laboratory, Cairo,[30] for the year 1929 contains much valuable information regarding the problems connected with eye disease in Egypt. The Director (Dr. R. P. WILSON), in reviewing the causes of blindness in the country, states "the need for the urgent collaboration of all to deal with the acute purulent ophthalmias cannot be too strongly emphasized." Slit-lamp examination showed that in the black Soudanese races pigment does not stop short at the limbus, but is lightly distributed throughout the whole of the corneal epithelium. The investigation of trachoma naturally received much attention. The follicular conjunctival inflammation which is so common in monkeys was observed to be free from cicatrization or pannus even over a period of three years. In this condition, too, follicles did not rupture

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25 PERETZ (H.). Nouvelle étude des complications préopératoires des yeux atteints de la cataracte en Egypte. Considérations générales et indications pratiques.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 1–7. [6 refs.]

26 BARRADA (M. A.). A Device for separating the Lids in Cataract Operations.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 10–13. With 4 figs. on 2 plates.

27 MEYERHOF (Max). On Interstitial Trachomatous Keratitis.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 17–20. With 1 plate.

28 EL-KATTAN (M. Azmi). Some Observations on Trachoma of the Cornea.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 21–23. With 5 plates.

29 MASSOUD (Farid). The Differential Leucocyte Blood Count in Relation to Diseases of the Eye.—*Bull. Ophthalm. Soc. Egypt.* 1930. Vol. 23. pp. 38–63. [34 refs.]

30 EGYPT: Ministry of the Interior. Department of Public Health. Fourth Annual Report of the Giza Memorial Ophthalmic Laboratory Cairo 1929 [WILSON (Rowland P.), Director].—138 pp. With 16 plates. 1930. Cairo.

spontaneously nor were they found on the tarsal portion of the membrane. Attempts to cultivate the *B. granulosis* from cases of Egyptian trachoma proved negative. An interesting survey of ophthalmic disease in a typical Egyptian village is recorded. This was carried out by Dr. ABDEL LATIF EL-KIRDANI and proved the extraordinary prevalence of conjunctival disease in early childhood. It is believed that children rarely complete the age of two years without having contracted trachoma. Acute gonococcal ophthalmia is chiefly responsible for blindness, but trachoma plays the greatest part in reducing the visual capacity of the people. Primary glaucoma is indeed a more serious cause of blindness than is trachoma. Details of many interesting cases are recorded and the Staff of the Institute and the publishers of the Report deserve much praise for the quality of their work.

H. Kirkpatrick.

MEDICAL ZOOLOGY.

HEGNER (Robert) & CHU (H. J.). **A Survey of Protozoa Parasitic in Plants and Animals of the Philippine Islands.**—*Philippine Jl. Sci.* 1930. Nov. Vol. 43. No. 3. pp. 451–480. With 57 figs. on 5 plates. [35 refs.]

The authors in the Philippine Islands have examined Negritos, monkeys, a Tarsius lemur, a flying "lemur," water buffaloes, pigs, dogs, rabbits, guineapigs, rats, civet-cats, bats, 47 species of birds, a turtle, a python, some water-lizards (Hydrosaurus), some skink lizards (Mabuia), frogs and toads, pond-snails, houseflies, mosquitoes, cockroaches, and 37 species of plants, for parasitic Protozoa, and in their results have incorporated some relevant and useful information from other authors in other parts of the world. The outcome is an interesting and valuable contribution to parasitology from the long tale of which a few items are here selected.

Of thirteen Negritos examined, all were infested with *Entamoeba coli* (also with hookworms), 7 with *Endolimax nana*, and 4 with *Trichomonas hominis*. Among forty-four wild monkeys 10 were infested with *E. histolytica*, 22 with *E. coli*, 37 with *E. gingivalis*, 22 with *Endolimax nana*, 2 with *Dientamoeba fragilis*, 6 with *Giardia lamblia*, 37 with *Trichomonas hominis*, 36 with *T. buccalis*, 2 with *T. vaginalis*, 15 with *Chilomastix mesnili*, and 8 with *Balantidium coli*; small flagellates resembling Embadomonas, Tricercomonas, and Hexamitus were also observed in some of the monkeys and doubtfully Iodamoeba, but never Coccidium or any blood-parasite. *Balantidium*, either *suis* or *coli*, was found in a wild pig as well as in slaughtered market pigs, and a *Balantidium* probably *haughwouti* in a Melania pond-snail. Giardia and Coccidium occurred in a civet-cat, and *G. canis* in one of 12 dogs. Of 40 bats of various species, insecti- and frugi-vorous, all were free from blood parasites and 2 insectivorous specimens showed Eimeria oocysts. Domiciliary cockroaches furnished a rich intestinal fauna—*Entamoeba blattae* and *E. thomsoni*, *Nauphoeta cinerea*, *Rhyporobia maderae*, *Nyctotherus ovalis*, *Hexamitus periplanetae*, *Lophomonas striata* and *L. blattarum*, *Retortamonas orthopterum*. In like manner the parasitic Protozoa of all the other hosts are recorded.

A. Alcock.

HEGNER (Robert) & CHU (H. J.). **A Comparative Study of the Intestinal Protozoa of Wild Monkeys and Man.**—*Amer. Jl. Hyg.* 1930. July. Vol. 12. No. 1. pp. 62–108. With 2 charts in text & 15 figs. on 2 plates. [4 pages of refs.] [School of Hyg. & Public Health, Univ. of the Philippines, Manila.]

A fine comparative study, strictly and explicitly critical, of the intestinal (and vaginal) protozoa of 44 (28 male and 16 female) wild *Macacus philippinensis* monkeys, considered—of course with all commonsense reservations—to have been free from the risks of human contamination to which captive monkeys are exposed. Every one of these monkeys was infested in some sort: one of them held 8 species of protozoa; several of them yielded 6 and 7 species; none had less than 2; the average for the individual monkey was about 4 species. The caecum was found to be the most heavily infested part of the intestine. Besides a number of small flagellates that were not carefully studied, the

following 11 species of protozoa were carefully observed in stained preparations and are here critically considered: *Entamoeba histolytica* in 10 monkeys, the encysted forms, which were not abundant, being for the most part uninucleate; *E. coli* in 22; *E. gingivalis* in 37, a remarkable incidence seeing that only one other reference to amoebae from the monkey's mouth is on record; *Endolimax nana* in 22; *Dientamoeba fragilis* in 2, a species not before discovered in a monkey, 24 per cent. were uninucleate and 76 per cent. binucleate; *Trichomonas hominis* in the large intestine of 37, *T. buccalis*, a species hitherto not recorded from monkeys, in the mouth of 36, and *T. vaginalis* (=*T. macacovaginae* of Hegner and Radcliffe) in 2; *Giardia lamblia* in 8, the trophozoites in the small intestine, particularly the duodenum, the cysts (few observed) in the colon; *Chilomastix mesnili* in 15; and *Balantidium coli* in 8, showing much diversity in size and a remarkable nucleus in which the chromatin is distributed in coarse granules at the intersections of a fibrillar network. There is an ample bibliography and there are two plates of figures and many tables of measurements, etc., and the individual species are debated in their structural characters, their chronological record, and their probable synonymy, so that the authors' specific identifications are well defended.

A. A.

CLARK (Herbert C.). **Progress in the Survey for Blood Parasites of the Wild Monkeys of Panama.**—*Amer. Jl. Trop. Med.* 1931. Jan. Vol. 11. No. 1. pp. 11–20. [3 refs.] [Gorgas Memorial Lab., Panama.]

This is merely a retrospect of 18 months; 210 wild and 43 captive monkeys have been examined for blood parasites.

The table includes 7 species, which are named, and their infections indicated in a general way. Malaria was existent in 4 species; "the parasites closely resemble human quartan and tertain," malaria pigment was observed in others; trypanosomes in 6 species, but seeming to be "little harmful"; microfilariae in 5 species, apparently "an important disease"; spirochaetes in the squirrel-monkey only and generally fatal to the young.

A. A.

MAZZA (Salvador). Papel de los protozoarios en las apendicitis. [**The Rôle of Protozoa in Appendicitis.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1930. Vol. 6. No. 46/47. pp. 29–33. [7 refs.] English summary.

[This short paper contains many points of interest.] The author examined 394 appendices immediately after their removal at the Institute of Clinical Surgery. He found parasites (one or more species; in 56 only one) in 63 of them (16·5 per cent.), namely, Entamoeba in 14; Giardia in 20; Trichomonas in 2; and Blastocystis in 34. In 6 others Charcot-Leyden crystals were abundant, but no protozoa either in the appendix or the faeces, and the author does not believe that they have any bearing on protozoal infection, in this situation at all events.

In 3 of the 10 with Entamoeba alone it was the vegetative form of *E. histolytica* without any cysts; in the other 7 *E. coli* (with cysts in one). In two the appendicular mucosa showed necrotic foci. The author refers to previous records of amoebic appendicitis, notably

HOGAN's case of peritonitis from perforation by amoebae (*Jl. Amer. Med. Assoc.*, 1920, Vol. 75, No. 11, p. 727). *Blastocystis hominis* was met with in 34 specimens; excision had been performed for appendicular pain, with nausea and vomiting; many were normal, some were adherent [possibly from old inflammation independent of Blastocystis]; none showed lesions of the mucosa except congestion. All those with Giardia had presented definite symptoms of appendicitis. The author notices the abundance of Trichomonas (in the only two cases in which it was found). A further point of interest is the relative leucocyte count. In those with *E. histolytica* there was an eosinophilia of 6–7 per cent. and a lymphocytosis of 42–52 per cent., while in the Blastocystis patients the lymphocytes were up to 66 per cent. with few eosinophiles, except when Trichomonas was also present; under these circumstances there was an eosinophilia of 12·5 per cent.

H. H. S.

SCHILLING (Claus) & SCHRECK (Hans). Bleiben erworbene biologische Eigenschaften pathogener Protozoen bei der Passage durch die natürlichen Ueberträger erhalten?—*Deut. Med. Woch.* 1930. July 11. Vol. 56. No. 28. pp. 1163–1164. [Robert Koch Inst., Berlin.]

—— & ——. **The Influence of Passage through the Invertebrate Host on the Biological Characters of Parasitic Protozoa.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 437–442. [Robert Koch Inst., Berlin.]

Starting with the proposition that an animal which has passed the acute stage of a protozoan infection can be superinfected by a serum-fast or relapse strain, but not by the original strain of that infection, the question asked here is what happens to a relapse-strain (and it applies equally to a drug-fast strain) if it passes through the insect that as a rule transmits the correlated disease in nature—does it keep the acquired quality [of serum-fastness] or does it lose it, regaining the qualities of the primary strain? The answer given here is that in the case of *Trypanosoma brucei* and *Glossina morsitans* the passage through the natural transmitter "has a decisive influence on an old laboratory strain (virulence, reactivity to specific antibodies of serum). As this reactivity to antibodies is a characteristic of relapse strains, we may conclude that the passage through the tsetse-fly has changed a relapse strain into an original strain." This answer is based on experiments carried on in Makatumbe, a small coral island off Dar-es-Salaam where neither tsetse-flies nor indigenous vertebrates exist. The authors took with them to the island: (1) tsetse-flies (*G. morsitans*) from which they bred the certainly clean flies for experiment; (2) an old laboratory strain of *T. brucei*—here designated Hamburg-Alt strain—possessing high virulence and reactivity to specific antibodies of the serum; and (3) a strain of *T. brucei* originally taken from a wild gnu and afterwards maintained by fly-vertebrate-fly passage—a strain (strain Gnu) much less virulent than Hamburg-Alt. In the island the Hamburg-Alt strain in an infected goat was passed through laboratory-bred flies to other animals, the final issue being labelled Hamburg-recens. "The trypanosomes of strain Gnu behaved in different experiments *in vitro* and *in vivo* exactly like the Hamburg recens trypanosomes," and the authors therefore infer that "the passage through the tsetse-fly has

changed a relapse strain into an original strain." "The fastness of a relapse strain against the serum-antibodies is an acquired quality. It is lost by the passage of the parasite through the insect. So we have an example of mutative loss of an acquired quality: an interesting fact in heredity." [For an interesting contrast to this last conclusion, attention may be drawn to a paper by Miss ROBERTSON (this *Bulletin*, Vol. 27, p. 279) on a specific drug-fastness acquired by *Bodo caudatus* in one medium and maintained through many generations of passage in media devoid of the specific drug.]

A. A.

CARPANO (M.). Infections latentes à hémoprotozoaires. Maladies intercurrentes et récidives. [**Latent Infections with Haemoprotozoa.**]—*Ann. Parasit. Humaine et Comparée.* 1930. Dec. 1. Vol. 8. No. 6. pp. 638–658. With 7 text figs. [17 refs.] [Ministry of Agric., Cairo.]

The author writes as a veterinary pathologist full of experience in tropical and subtropical regions where, in the absence of exact knowledge of the nature of a particular virus, he might have to make use of the blood or serum of a sick or recently convalesced sufferer from the disease, for preventive inoculations. His eye is chiefly on the individuals that although clinically cured of a specific protozoan disease may retain the infection in a latent state for a long time afterwards. Such an individual is not only a hidden reservoir and an insidious disseminator of that infection, but with his latent infection may also—all unsuspected—mask, or complicate, or aggravate the effects of another and different infection subsequently incurred. The possible influence of some prior infection, dormant or otherwise, needs no vindication among medical men. The moral of the author's story is intensified study of animal pathology, and incessant and persevering microscopic examination of the blood.

A. A.

ANDREWS (Justin) & PAULSON (Moses). **The Effect of Barium Sulphate upon the Incidence of Human Intestinal Protozoa.**—*Jl. Lab. & Clin. Med.* 1930. Oct. Vol. 16. No. 1. pp. 39–42. [3 refs.] [School of Hyg. & Public Health, Johns Hopkins Univ. & Johns Hopkins Hosp. & Med. School, Baltimore.]

In a series of 40 persons receiving barium-sulphate preparatory to X-ray examination of the gastrointestinal tract it was observed that the incidence of protozoa in faeces was 13·7 per cent. of those who had *not* received the $BaSO_4$ within 6 days of preparation and only 8·7 per cent. of those who had. Subsequent experiment *ad hoc* showed that ingestion of $BaSO_4$ resulted in such a reduction of protozoa per unit-volume of stool that it was frequently impossible to detect any. Amoebae were more obviously affected than flagellates. The decrease was transitory, lasting only as long as $BaSO_4$ remained in the bowel. The authors think therefore that the mass of Ba salt acts largely by mechanical augmentation or massive "dilution" of the ordinary intestinal contents.

A. A.

CARDAMATIS (J. P.). Méthode de coloration des plasmodes et des protozoaires qui persiste sans changement pendant 25 ans. [**Long-Persisting Stains of Plasmodia and Protozoa.**]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 787–789.

Description of another slight modification of eosine-methylene-blue staining for protozoa, the chief superiority of which is claimed to be that its effects retain unfading beauty for twenty-five years or more. MM. BRUMPT, NATTAN-LARRIER, and MARCHOUX said that in their respective collections they had many preparations, stained with LAVERAN's eosine-Borrel-blue, which had kept their colour perfectly for 25 years and more.

A. A.

CLEVELAND (L. R.) & COLLIER (Jane). **Various Improvements in the Cultivation of** *Entamoeba histolytica.*—*Amer. Jl. Hyg.* 1930. Nov. Vol. 12. No. 3. pp. 606–613. [9 refs.] [Med. School, Harvard Univ., Boston.]

Numerous media for cultivating *Entamoeba histolytica* employed by various workers are here briefly discussed and the authors specifiy many that they have used themselves. They state, generally, that in their experience " the best slants are Loeffler's dehydrated serum and liver-infusion agar, and the best liquids are fresh horse-serum saline and 3 per cent. hydrolysed haemoglobin." More particularly they state that " When liver-infusion agar slants are covered with serum saline and a small amount of sterile rice flour is added to each tube, it is possible to start a culture of *Entamoeba histolytica* from a single organism. . . . The amoebae become practically as numerous as blood cells in the bloodstream, and encystation, excystation, and metacystic development occur simultaneously with rapid multiplication of trophozoites." The paper is not one that can be summarized to any useful purpose.

A. A.

BROWNE (Donovan C.). **Effect of Vital Stains on Cultures of** *Endamoeba histolytica.*—*Proc. Soc. Experim. Biol. & Med.* 1930. Dec. Vol. 28. No. 3. pp. 255–257. [1 ref.] [Dept. of Path. & Bact., Tulane Univ., New Orleans.]

Of the water-solutions tried neutral red and Janus green were the two best ; both are non-toxic up to 1 per cent. solution ; the first stains quickly, the second very slowly ; with both the ectoplasm and endoplasm are well differentiated, and the nucleus shows distinctly ; Janus blue stains the endoplasm pale pink.

Trypan blue and Nile blue are not well tolerated in solutions above 0·5 per cent. ; the first was found " unsatisfactory and not consistent." Brilliant cresol blue " proved unsatisfactory " besides seeming more toxic.

A. A.

DESCHIENS (R.) & GOURVIL (E.). Les entamibes de la bouche des singes. [**Entamoeba of the Monkey's Mouth.**]—*Bull. Soc. Path. Exot.* 1930. July 9. Vol. 23. No. 7. pp. 711–714. With 1 text fig. [5 refs.]

Systematic study of the mouth of 21 monkeys (*Papio sphinx* and *Macacus rhesus*) in the simiary of the Pasteur Institute, has disclosed in

8 cases the presence of *Entamoeba gingivalis* of Gros. Actual comparison precludes doubt, and reciprocal inoculation is confirmative. For convenience, however, the author proposes that the one should be called *E. gingivalis* var. *hominis*, and the other *E. gingivalis* var. *simiae* nov.

A. A.

TAO (S. M.). *Giardia intestinalis* **in North China. A Study of 649 Cases.**—*Nat. Med. Jl. China.* 1930. Aug. Vol. 16. No. 4. pp. 347–359. [55 refs.] [National Epidemic Prevention Bureau, Peking.]

This is an analysis of cases of *Giardia intestinalis* infection from the records of the Peiping Union Medical College Hospital for the years 1925 to 1930. Of 12,980 patients examined 649 (5 per cent.) were infected with Giardia. (Faecal examinations were made, as circumstances permitted, six times or more in 137 cases, five times in 55 cases, four times in 61 cases, three times in 166 cases, twice in 100 cases, and once in 130 cases.) Of the 649 cases in which the parasite was discovered 475 were in-patients, and 180 were one to fifteen years of age.

Of these 649 cases, 249 were associated with gastro-intestinal symptoms, and 400 were not so associated. Of the 249 gastro-intestinal cases, 87 were " pure " infections of Giardia alone and all the others were " mixed " infections.

The phenomena recognized by the author as commonly associated with Giardia infection are diarrhoea, dyspepsia, dysentery, abdominal pain or discomfort, and—less commonly—hepato-biliary and duodenal disorder.

In the author's " pure " infections children from one to fifteen years showed 19·59 per cent. of diarrhoea and 23·82 per cent. of dyspepsia, whereas in " mixed " infection the corresponding figures were 10·18 per cent. for diarrhoea and 13·77 per cent. for dyspepsia. Dysentery was a symptom in 13 cases of " pure " infection and also in 13 cases of " mixed " infection. The percentages for dyspepsia, diarrhoea, and dysentery are therefore in young persons much higher in pure infection than in mixed infection, though it must be remembered that diarrhoea is normally common in young children. Most of the patients suffering from abdominal pain and discomfort had a clinical diagnosis of indigestion, or constipation, or appendicitis, or duodenal ulcer, and therefore, in the author's opinion, these symptoms afford no trustworthy aid. In the whole series of 649 cases of Giardia infection there were 7 cases of duodenal ulcer and 16 cases of enteritis, " but Giardia infection cannot be considered as a factor in their causation as the percentage of such cases is low." Stovarsol in 0·06 gm. doses was given to 8 patients, with success in 6, but in the other 2 parasites were not exterminated even after (in one case) 7 doses.

The author's opinions are hesitating and rather confusing. He admits that his studies show " that *Giardia intestinalis* may be associated with certain gastro-intestinal disturbances " but concludes that " a definite relation between Giardia infection and gastro-intestinal symptoms could not be established."

A. A.

i. TSUCHIYA (H.). **A Comparative Study of Two Diverse Strains of** *Giardia lamblia* **Stiles, 1915.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 467–491. [26 refs.] With 6 figs.

ii. —— & MIZUSHIMA (H.). **Observations on a Double Mixed Infection of** *Giardia lamblia* **Stiles, 1915.**—*Ibid.* pp. 492–499. With 5 text figs. [4 refs.]

iii. ——. **A Comparative Study of Trophozoites of** *Giardia lamblia* **Stiles, 1915, under Varying Conditions.**—*Ibid.* pp. 500–502. [2 refs.] [Johns Hopkins School of Hygiene & Public Health, Baltimore.]

i. The purpose here is to determine whether heritably diverse strains of *Giardia lamblia* exist in man. The history of the subject is reviewed, and then a mass of biometric detail follows, from which the conclusion is formed that two such strains of the species are to be recognized. In strain A the cysts are larger and more elongate-ellipsoid; the trophozoites are more elongate and have the parabasals short, triangular, and transverse; moreover, excystment took place with ease, and trophozoites appeared at the slightest provocation from magnesium sulphate. In strain B the cysts are smaller and more broadly ellipsoid; the trophozoites are shorter and slightly broader and the parabasals are longer, crescentic, and oblique; moreover, no excystment could be effected at any stage of experiment, and repeated and varied provocation was necessary to obtain even a small number of trophozoites.

ii. In "the course of studies on *Giardia lamblia* of two individuals one of us accidentally became infected." There followed an attack of diarrhoea, succeeded by an intense pain at the epigastrium, sensations of hunger soon after eating, nausea, headache, and other symptoms, and the appearance in the stools of Giardia cysts of varying dimensions. Study of the cysts showed the presence among them of a strain X, significantly different in length of cysts and in type of frequency distribution from those of strain A or strain B, and calculated to be the result of a mixed infection of A and B.

iii. This is a comparison between the trophozoites of *Giardia lamblia* obtained by duodenal aspiration and those obtained by catharsis and those occurring in normal stools—the last being assumed to be fresh excystments. Those direct from the duodenum are longer and broader than the others, and their coefficients in length and breadth show greater variability. Hence it is argued that the trophozoites achieve their optimum growth in the duodenum.

A. A.

TSUCHIYA (H.) & ANDREWS (Justin). **A Report on a Case of Giardiasis.**—*Amer. Jl. Hyg.* 1930. July. Vol. 12. No. 1. pp. 297–298. [3 refs.] [Johns Hopkins School of Hyg. & Public Health, Baltimore.]

In the course of *G. lamblia* study one of the authors swallowed some cysts. Some time afterwards he suffered "for a few days" from fatigue, premonitory to an attack of diarrhoea succeeded by intense epigastric pain and by feelings of hunger after feeding. The pain lasted for a day, and then intermittently for two days more. All the while there was headache, and spells of nausea and dizziness. There was some lymphocytosis (26 per cent. small lymphocytes) and slight eosinophilia (4 per cent.). A multitude of cysts of *G. lamblia* appeared in the stools. Treatment consisted of two tablets of stovarsol (0·25 gm. each) daily for five consecutive days. On the 3rd day of treatment the symptoms disappeared (except

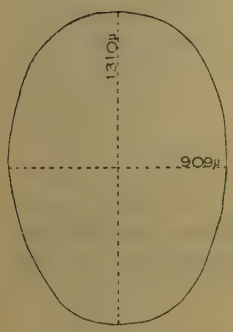

Fig. 1

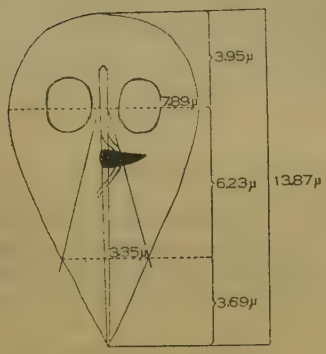

Fig. 2

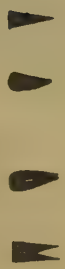

Fig. 3

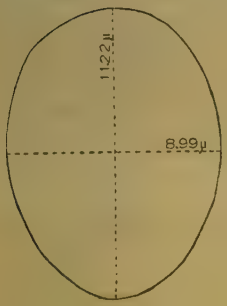

Fig. 4

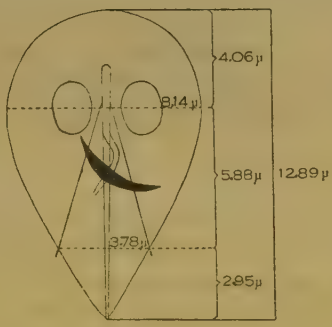

Fig. 5

Fig. 6

Fig. 1. Diagram showing the average length and breadth and shape of 3,600 cysts of strain A of *Giardia lamblia* (x 3,600).

Fig. 2. Diagram showing the average dimensions and shape of 100 trophozoites of strain A of *Giardia lamblia* (x 3,600).

Fig. 3. Diagram showing the number and shape of parabasals of strain A of *Giardia lamblia* (x 3,600).

Fig. 4. Diagram showing the average length and breadth and shape of 2,800 cysts of strain B of *Giardia lamblia* (x 3,600).

Fig. 5. Diagram showing the average dimensions and shape of 100 trophozoites of strain B of *Gardia lamblia* (x 3,600).

Fig. 6. Diagram showing the number and shape of parabasals of strain B of *Giardia lamblia* (x 3,600).

[Reproduced from the *American Journal of Hygiene*.]

for slight epigastric pain after taking stovarsol on an empty stomach), on the fifth day of treatment no cysts were observed in the stool, and on the day after the course of treatment no organisms could be detected in the stools, after purgation. Since the symptoms were known to be concurrent and conterminous with the presence of the cysts and an investigation of the patient's history negatived any alternative explanation of the symptoms, the authors conclude that the case is a demonstration of a morbid state caused by Lamblia infestation. [The authors do not state the length of the interval between the accidental swallowing of the cysts and the onset either of premonitory symptoms or of diarrhoea and pain.]

A. A.

DESCHIENS (R.). Recherches sur l'infection des voies biliaires par les lamblies. [**Studies on the Infection of the Biliary Tract by Lamblia.**] —*Arch. de l'Appareil Digestif et des Malad. de la Nutrition.* 1930. Oct. Vol. 20. No. 8. pp. 951–957. [18 refs.] [Pasteur Inst., Paris.]

The author accepts as the only consummating evidence of the infestation of the gall-bladder by vegetative forms of Giardia, the finding of them there at a surgical removal of the organ (or in animals at an autopsy *ad hoc*). In 12 recorded human cases of giardiasis investigated by the author their presence in the gall-bladder was thus demonstrated only in 3; and in 12 cases in mice autopsied by the author and KIPCHIDZE they were present in the duodenum in every one (and also in the ileum in 6) but were not found in the gall-bladder in any one. The author thus concludes that Giardia infestation of the intestine is usual, and of the biliary tract exceptional or rare.

A. A.

FITTIPALDI (C.). Lambliasi intestinale. [**Intestinal Lambliasis.**]—*Riforma Med.* 1930. Dec. 1. Vol. 46. No. 48. pp. 1929–1930. With 1 text fig. [Hosp. for Incurables, Naples.]

A medical man, 32 years old, suffered for four years with diarrhoea and abdominal discomfort and pain; 6–8 actions daily, fluid with flakes of mucus. He was emaciated. Faecal examination revealed many Lamblia cysts and a few vegetative forms. Treatment was begun with emetine injections [number and dose not stated] and followed by stovarsol, 50 cgm. daily. Improvement was rapid and to complete the cure thymol was given. The author maintains the pathogenicity of this protozoon.

H. H. S.

GOUREVITSCH (D.). Zur Frage der Pathogenität der Lamblien und Trichomonas bei Kindern und der Therapie mit Myosalvarsan. [**On the Pathogenicity of Lamblia and Trichomonas in Children, and Treatment by Myosalvarsan.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Jan. Vol. 35. No. 1. pp. 26–36. [7 refs.]

From study of what has been written, as from his own observations of cases, the author concludes that Lamblia and Trichomonas in children are causes of (mostly) gastro-intestinal disorder. For treatment myosalvarsan is recommended, in 0·05 to 0·15 gm. doses once a week for 4 weeks, by intramuscular injection, or 5 per cent. solution of sulphoxyl-salvarsan in 1·5 cc. doses.

A. A.

RODECURT (M.). Ein Jahr Trichomonasfluorbehandlung mit Yatren 105-Pillen. [**A Year's Experience of Yatren 105 Pills in the Treatment of Trichomonas Vaginitis.**]—*Med. Klin.* 1930. Aug. 15. Vol. 26. No. 33 (1340). pp. 1228–1229. [1 ref.]

The author has treated 112 cases of this infestation. A " pill " is inserted into the vagina every 2nd or 3rd day, and afterwards at longer intervals; the patient can manage the treatment herself. It is said to be rapidly curative.

A. G. B.

COVENTRY (Frances A.). **The Trypanocidal Action of Specific Antiserums on** *Trypanosoma lewisi in vivo.*—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 366–380. [27 refs.] [Dept. of Hyg. & Bact., Univ., Chicago.]

The objects of this work were, firstly to study the mechanism of the sudden reduction in the number of trypanosomes which occurs in infections with *T. lewisi* about the tenth day of infection; secondly, to study the mechanism of their final destruction at the end of infection; and thirdly to study *in vivo* the action of immune serum in relation to the occurrence of the zone phenomenon, since destruction of the parasites was found to be associated with a passively transferable parasiticidal property of the serum. The following conclusions were reached as the result of this work:—

" 1. A passively transferable trypanocidal substance was demonstrated in serum obtained from rats during the course of uninfluenced infections with *Trypanosoma lewisi*. When tested *in vivo* against *T. lewisi* which had just appeared in the blood but had not yet undergone a number crisis, the trypanocidal power was manifested by a decrease in numbers or the complete disappearance of the trypanosomes within 1 to 5 hours after the injection of the serum.

" 2. The presence of a trypanocidal substance in the serum during the course of infection is probably correlated with the occurrence of the first number crisis which occurs in uninfluenced infections with *T. lewisi* about the sixth to tenth day of infection.

" 3. Serum obtained from rats shortly after the end of an uninfluenced infection exhibited a similar trypanocidal action when tested in the same way. Such serum was trypanocidal to trypanosomes tested either before or after the first number crisis. Serum tended to lose its curative power within a few weeks after the termination of infection.

" 4. When serum obtained during or soon after the end of infection was given in graded doses to a series of rats, in certain series recurring zones of complete or partial action and of inaction tended to occur; i.e., the serum caused complete disappearance or diminution in number of trypanosomes in certain doses of a series, was ineffective in slightly higher doses, was effective in still higher ones, and so on.

" 5. The zonal phenomenon appeared to depend on the number of trypanosomes present in the rats at the time the doses of serum were administered:

" (*a*) When there were very few trypanosomes (1–20 per field) the serum tended to be effective in all doses.

" (*b*) When there were slightly more numerous trypanosomes (20–40 per field) the serum tended to show the zonal phenomenon.

" (*c*) When there were very numerous trypanosomes (approximately 50 per field) the serum tended to be ineffective.

" 6. The curative effect was more marked after intravenous injection of the serum, but curative and zonal action followed either intravenous or intraperitoneal injection.

"7. Inactivation did not decrease the curative power of the serum. Moreover, the zonal phenomenon was independent of inactivation.

"8. Serum from rats and rabbits hyperimmunized against *T. lewisi* by repeated injections of the living parasites exhibited similar curative and zonal action."

W. Yorke.

MARMORSTON-GOTTESMAN (J.), PERLA (David) & VORZIMER (Jefferson). **Immunological Studies in Relation to the Suprarenal Gland. VI a.** *Trypanosoma lewisi* **Infection in Normal Albino Rats. VI b.** *Trypanosoma lewisi* **Infection in Suprarenalectomized Adult Albino Rats.** —*Jl. Experim. Med.* 1930. Oct. 1. Vol. 52. No. 4. pp. 587–600. With 1 text fig. [21 refs.]

PERLA (David) & MARMORSTON-GOTTESMAN (J.). **Further Studies on** *T. lewisi* **Infection in Albino Rats. I. The Effect of Splenectomy on** *T. lewisi* **Infection in Albino Rats and the Protective Action of Splenic Autotransplants. II. The Effect of Thymectomy and Bilateral Gonadectomy on** *T. lewisi* **Infection in Albino Rats.**—*Ibid.* pp. 601–616. With 4 text figs. [18 refs.] [Montefiore Hosp., New York.]

It has been shown, as the authors adduce, that the suprarenal glands play an essential part in the processes of resistance to toxins and bacterial infections and that (in albino rats) removal of these glands lowers this resistance and diminishes the capacity for antibody formation. The object of the present studies is to determine what part the suprarenals and other glands of internal secretion play in resistance to a protozoan infection as exemplified in *Trypanosoma lewisi.*

The course of this infection was studied in 40 normal albino rats as a basis of comparison. The rats were all of one stock and raised in one Institute; except as otherwise specified they were 3 months old. They were kept in a uniform environment and on a standard adequate diet. A given strain of *T. lewisi* was maintained by weekly transference, and a standard amount of infected heart-blood diluted with citrated physiological saline was used in intraperitoneal inoculations. In these circumstances the infection in the normal white rat lasts about a month, its height being at about the 7th day. It produces a definite disease, during the first 10 days of which the spleen gradually enlarges to 6 or 7 times the normal size, with hyperplasia of the follicles, congestion of the pulp, and marked phagocytosis of the red cells by reticular and endothelial elements. With recovery the spleen proceeds to contract. Concomitant Bartonella infection causes a moderate anaemia. The best indications of natural resistance by the rat are afforded by daily counts of trypanosomes, by the length of the show of developing forms, and by the duration of the infection. The serum of the rat during the continuance of infection is highly anticomplementary; after recovery complement-fixing antibodies can be detected for a long term, and the best antigens for detecting them are saline extracts of rat-spleen removed at the height of infection, and saline washings of unkilled cultures of trypanosomes. The immunity to *T. lewisi* subsequently enjoyed by the rat is thus an acquired immunity.

T. lewisi being distinctly pathogenous for normal rats (and to very young rats occasionally fatal), the results of this infection in rats after the suprarenals had been removed are next studied and may be thus summarized: After removal of both suprarenals the resistance to an infection is lowered, but the multiplication of the trypanosomes is not enhanced, nor is the disease protracted, nor yet is the production of immunizing substances intercepted; the defection in natural resistance must therefore be due to the toxic effects of the parasite. The immunity to *T. lewisi* acquired by normal rats as a result of infection is not broken by subsequent

removal of the suprarenals. After removal of one kidney, or after injury to the tissue round the suprarenal areas the infection pursued its usual course as in the normal rat; all the rats (13) survived and acquired immunity to re-infection.

Further experiments on the results of splenectomy, of the removal of the thymus gland and of the testes are thus summarized by the authors themselves :—

"The mortality of splenectomized rats from *Bartonella muris* anemia increases from 30 to 100 per cent. following the injection of *T. lewisi* at the height of the anemia 7 days after splenectomy. *T. lewisi* infection 48 days after splenectomy that is to say at a time when the *Bartonella* anemia is no longer present produces a more severe infection than in normal rats. The number of trypanosomes at the height of infection averages 3 times the ordinary and the infection endures twice as long. Both the immune substance that inhibits the reproduction of the parasite and the lytic factor are markedly depressed. Splenic autotransplantation performed 4 weeks prior to splenectomy raises the resistance of rats to a subsequent *T. lewisi* infection. Thymectomy in 6 week old rats diminishes the severity of a subsequent trypanosome infection and shortens its course. Both the formation of the immune substance which inhibits reproduction of the trypanosomes and formation of trypanolytic antibodies are stimulated by this procedure. In the adult rat thymectomy shortens the course of the infection but the severity is only slightly diminished. Bilateral gonadectomy in the adult increases the severity of the infection. The number of trypanosomes at the height of the infection is almost three times the normal. However, the duration of the infection is the same as in the normal rats. The reproduction-inhibiting factor is depressed by bilateral gonadectomy but not the trypanocidal factor. Unilateral gonadectomy does not influence the infection."

A. A.

SCHWETZ (J.). *Trypanosoma lewisi* et splénectomie. [**The Effect of Splenectomy on Receptivity to** *T. lewisi*.]—*Ann. Parasit. Humaine et Comparée.* 1931. Jan. 1. Vol. 9. No. 1. pp. 10–14. [6 refs.] [Parasit. Lab., Stanleyville.]

The author criticizes the conclusions of REGENDANZ and KIKUTH and of BRUYNOGHE and VASSILIADIS with regard to the effect of splenectomy in rendering rats and mice receptive of infection with *Trypanosoma lewisi*. In his own experiments with rats of Stanleyville, a large proportion of the adults of which—but never the young—are found naturally infected with *T. lewisi* of typical form but rarely (only one individual so far) with dividing forms and rosettes, he finds no conclusive evidence that splenectomy has any such effect. He desplenated 20 rats, of which 6 were infected with *T. lewisi* and 14 were not infected. The operation had no effect upon the infection of the 6, except that in 3 of them dividing forms appeared. Of the 14 uninfected, 12 still remained free of infection until their death or disappearance (17 to 95 days after the operation); but 2 did show trypanosomes, one of them 7 days, the other 34 days after the operation, though the author is not convinced that the appearance of the parasites was attributable to the operation, since both these rats were infected with fleas.

A. A.

CLEVELAND (L. R.) & COLLIER (Jane). **The Cultivation and Differentiation of Haemoflagellates in Autoclaved Media.**—*Amer. Jl. Hyg.* 1930. Nov. Vol. 12. No. 3. pp. 614–623. [4 refs.] [Med. School, Harvard Univ., Boston.]

This paper consists of descriptive detail of nineteen kinds of autoclaved media used by the authors, and of statistical tables of comparative flagellate

growth in certain autoclaved and not-autoclaved media. It cannot be abridged.

A. A.

CLARK (Herbert C.) & DUNN (Lawrence H.). **Experimental Efforts to transfer Monkey Malaria to Man.**—*Amer. Jl. Trop. Med.* 1931. Jan. Vol. 11. No. 1. pp. 1–7. [2 refs.] [Gorgas Memorial Lab., Panama.]

The authors, after stating that the New World monkey-malaria "is difficult if not impossible to distinguish from human quartan and tertian malaria," describe their careful attempts to transmit the malaria parasites of some wild Spider-monkeys (Ateles) to some men. They used three wild red spider-monkeys, *Ateles geoffroyi*, from the Panama jungle, all with naturally acquired malaria infection in "a moderate degree." To begin with, five young men (18 to 21 years) received, part *intravenim* part *subcutim*, 1·5 cc. of undiluted whole monkey heart-blood. "None of the five men developed any noteworthy evidence of illness, although a few doubtful intracorpuscular bodies were found in an occasional blood-film" by the four experts who did the routine search of films. A control monkey inoculated from the same source as the men showed malaria infection on the 11th day, became very ill with the disease, and died of it on the 48th day." Work was then started on the local Anopheles, two species of which, namely *A. albimanus* and *A. tarsimaculatus*, were proved to be efficient hosts of the monkey parasite. The four available species of Anopheles were bred and were fed on the malaria monkeys, some of them on a very heavily infected "infant" Ateles. Three of the young men were in due time freely subjected to the infected Anopheles; they were observed for some weeks afterwards, but nothing of consequence was noticed except in the case of one man who had several rises of temperature to about 100° F. and whose films on two occasions showed "one or two forms" that were considered to be malaria parasites. This experiment was subsequently repeated when all five men were subjected to the attentions of Anopheles fed on monkeys carrying gametes. "Nothing resulted from these efforts to transfer the parasite." One experiment was made with a heavily parasitized black spider-monkey, 2 cc. of whose blood was injected subcutim into each of two of the men. Nothing of note resulted, although a control white-face monkey showed infection on the 11th and became seriously ill. CRAIG subsequently gave a historical review of attempts to transmit monkey malaria to man and *vice versa*.

A. A.

CANNON (Paul R.) & TALIAFERRO (William H.). **Acquired Immunity in Avian Malaria. III. Cellular Reactions in Infection and Superinfection.**—*Jl. Preventive Med.* 1931. Jan. Vol. 5. No. 1. pp. 37–64. With 1 coloured plate. [20 refs.] [Depts. of Path., Hyg. & Bact., Univ., Chicago.]

This is a finished study, mainly corroborative in result, but precise and full of exact and critical detail, of the processes of defence in birds (canaries) experimentally inoculated with avian malaria (*Plasmodium cathemerium*). Since it is known that the defence is phagocytic, attention was fixed particularly on the tissues richest in phagocytic cells—

that is, on the reticulo-endothelial system. In the study of pathological changes incident to a *primary* infection a minute description of the nature and succession of the cell-reactions registered in the tissues of the spleen and liver is given; it is a record, up to the stage of crisis, of heightened activity of the mesenchyme and destruction of the parasites by macrophages chiefly of the spleen and liver; the outstanding feature immediately following the crisis is accumulation of pigment in these macrophages, and subsequently its comparatively rapid disappearance as contrasted with human malaria. In birds having a *latent* infection "the altered reactivity of the mesenchyme following the crisis persists," so that in attempts at superinfection phagocytosis is well started within 15 minutes and the injected parasites cannot be found in the peripheral blood 24 to 48 hours afterwards; this activity declines very slowly as tested by attempts at superinfection, being still effective 654 days after the initial infection. Thus acquired immunity to superinfection is primarily cellular and consists in an increased rate of phagocytosis by the cells of the reticulo-endothelial system, especially of the spleen and liver.

The paper is prefaced by a historical retrospect, concludes with a list of references, from DANILEWSKY 1890, and is illustrated by a good coloured plate.

A. A.

i. MARCHOUX (E.) & CHORINE (V.). Conditions qui régissent le processus de la fécondation pour *Haemoproteus paddae*. Température. [**Conditions that govern Fecundation of** *Haemoproteus paddae*. **Temperature.**]—*C.R. Soc. Biol.* 1931. Feb. 6. Vol. 106. No. 4. pp. 261–263.

ii. —— & ——. Influence de la concentration sur le processus de fécondation des gamètes d'*Haemoproteus paddae* à la température de 21°. [**Influence of Density of the Medium on Fecundation of Gametes of** *Haemoproteus paddae* **at 21° C.**]—*Ibid.* pp. 263–264.

i. Observations, *in vitro*, under a suitable technique, of the process of fertilization of the macrogametes of *Haemoproteus paddae* show that oocinetes are formed readily (at 4 to 6 minutes) at temperatures from 20° to 30° C. At about 36° C. fertilization occurs very quickly (at 1½ minutes) but about this temperature the further development of the macrogamete ceases and it degenerates in 24 to 48 hours. On the other hand, cooling of the blood below 20° delays fecundation—to 17 to 20 minutes, at 13° C.

ii. Further observations under varying conditions of concentration, brought about by withdrawal of fluid or by additions equal to 0·25 to 1·0 per cent. salt solution, showed that neither rapidity nor achievement of fecundation was sensibly affected by such changes in the density of the medium.

A. A.

MANALANG (C.). **Coccidiosis in Anopheles Mosquitoes.**—*Philippine Jl. Sci.* 1930. June. Vol. 42. No. 2. pp. 279–281. With 4 figs. on 2 plates.

In "about 1 or 2 per cent." of Anopheles imagos of all the common species occurring in certain places in Luzon the author found, in all parts of the body except the midgut, the brain, and the ovary, oocysts of a coccidioid. In only one instance was the infection found in a larva. In one place the infection was extremely frequent and sometimes so intense

as to be fatal. The author kept some of the oocysts for 3 months in a moist atmosphere at room temperature without observing any notable change in them, and he here describes and figures them as "Coccidium."

A. A.

SCHUMAKER (Eugene). *Balantidium coli*: **Host Specificity and Relation to the Diet of an Experimental Host.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 341–365. [17 refs.] [Johns Hopkins School of Hyg. & Public Health, Baltimore.]

The results of experimental cross-infection with *Balantidium coli* from the pig (and from man) into other species of animals are historically reviewed. The author's own experiments, undertaken with the object of providing a handy and susceptible laboratory animal for use in studying the influence of diet upon the parasite—e.g., the inhibitive effect of milk diet, suggested by GREENE & SCULLY (see this *Bulletin*, Vol. 21, p. 42), and the provocative influence of a carbohydrate diet indicated by AGUILAR (see this *Bulletin*, Vol. 24, p. 30)—are fully described and tabulated.

Using trophozoites of *Balantidium coli* from the caecum of the pig, 9 guineapigs, all ascertained to be free from the parasite, were inoculated within the stomach; six became infected, the maximum duration of the infection being 18 days; but this animal is deemed to be inconvenient for experimentation. Of 305 rats fed on a diversity of diets infection was established in 173, the maximum duration of infection being 159 days, division and conjugation being observed, but not encystment. Of 6 rats having a well-established and heavy infection and kept on a whole-milk diet the infection was entirely thrown off in one, greatly reduced in 7 days in three, and apparently unaffected in one—the remaining rat dying earlier, while still infected. Again, of 19 rats inoculated after being kept on a whole-milk diet, only 2 took the infection. A diet of 70 per cent. casein prevented infection in all of 18 experiments; and eliminated heavy infection in all of 12 experiments. Varied experiments proved that an existing infection was aggravated by an increasingly carbohydrate diet, and that a diet containing 93·5 per cent. carbohydrate and no casein was the most favourable, of all those used, for the development of Balantidium. Furthermore, it was observed that the presence of starch—either jellied or granular—in the caecum of the rat caused a great multiplication of the Balantidia within a few hours.

Since rats harbour "balantidia in numbers as great as 500,000 per cc. of caecal content" without any ill symptoms, it is concluded that the parasite is not pathogenous to the rat—under the observed conditions.

A. A.

SCHUMAKER (Eugene). **The Cultivation of** *Balantidium coli.*—*Amer. Jl. Hyg.* 1931. Jan. Vol. 13. No. 1. pp. 281–295. [16 refs.] [Johns Hopkins School of Hyg. & Public Health, Baltimore.]

The author briefly reviews some of the observations that have been recorded on Balantidium, since 1913, when PROWAZEK kept it alive for 7 days by mixing physiological saline with the faeces, and 1921, when BARRET and YARBROUGH described a method for its cultivation. With regard to the statement, originated by the latter authors, that it is anaerobic he states his own experience that it multiplies as freely under strictly anaerobic conditions as under aerobic conditions; but not better. The growth of Balantidium is not inhibited by an oxygen pressure of 18 lb. per sq. inch maintained for 32 hours. (The trophozoites from a rat were not killed by an oxygen pressure of at least 30 lb. per sq. inch maintained for 72 hours.)

In his cultivation experiments he followed quite successfully the technique of REES (*Science*, 1927, Vol. 66, pp. 89–91) and JAMESON (this *Bulletin*, Vol. 25, p. 263) but using only 10 cc. of medium per tube. This medium consisted of 1·0 cc. of sterile horse-serum and 9·0 cc. of sterile Ringer's solution of the formula NaCl, 6·5 gm.; KCl, 0·14 gm.; $CaCl_2$, 0·12 gm.; $NaHCO_3$, 0·2 gm.; NaH_2PO_4, 0·01 gm.; distilled water, 1,000 cc. With regard to the use of rice starch as a nutrient in cultures initiated by DOBELL and LAIDLAW (1926, this *Bulletin*, Vol. 24, p. 363), he finds that potato, wheat, corn, buck-wheat, and arrowroot starches served as well, and that inulin may serve to a slight extent. Balantidium multiplied at temperatures from 23° C. to 41° C.; the optimum seemed to be 37° C. to 39° C. Multiplication was not markedly inhibited at 41° C., but was greatly reduced at and below 34° C.

A. A.

SCHOURENKOVA (A.) & NOSSINA (V.). La culture du *Balantidium coli* Malm. d'origine humaine. [**Culture of** *Balantidium coli* **Malm. from Man.**]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 780–786. [4 refs.] [Trop. Inst., Moscow.]

A description in extensive detail of the management, behaviour, and development of *Balantidium coli* cultivated from human sources.

The medium consists of "a mixture of nutrient agar (or that used for N N N medium) 3 $cm._3$ and animal charcoal 0·05 $cm._3$; Locke's solution 8 $cm._3$ and normal horse-serum 1 $cm._3$; and 1 or 2 loopfuls of rice-starch." The medium is charged, preferably, with quite fresh human faeces (0·5 $cm._3$); incubated at 37° C. a brisk production of gas occurs, and in the turbid fluid that first collects at the very bottom of the culture-tube active balantidia are found in enormous numbers. Subcultures (into a similar medium already warmed) are made every 24 hours, but after the third subculture the interval may be increased to as much as 5 or 6 days. The number of balantidia—as also the amount of gas formed—decreases in successive subcultures. In the later subcultures the balantidia are also found feeding on the rice-starch. In subcultures of 2–4 days' growth a large number of very small (30–40 μ) forms are to be seen, some of them with a relatively large, widely open, and vertical peristome, and among these "an epidemic of conjugation" occurs. In the medium described encystment does not take place, but encystment of individuals—not of conjugants—may be observed if bouillon is substituted for Locke's solution.

A. A.

NORONHA (A. J.). **On the Occurrence of Protozoan Bodies in the Blood of Two Patients suffering from an Eruptive Fever.**—*Jl. Trop. Med. & Hyg.* 1931. Jan. 15. Vol. 34. No. 2. pp. 17–19. With 3 text figs. [Path. Lab., B.J. Med. School, Poona.]

In blood films of two of six cases of an eruptive fever in members of two American missionary families in Poona were found a few intra- and extra-corpuscular bodies some of which resembled Babesia in shape. It seems very doubtful if these are actual parasites. They may be artefacts or merely organisms deposited on the slide from the water used in staining. This view is supported by the facts that they occurred in films from only two of the cases, were very scarce, and possessed nuclei which took a bright violet colour with Leishman's stain. Similar bodies have been described previously, but in no case has their parasitic nature been established.

C. M. Wenyon.

MORISHITA (Kaoru). **A Flagellate Protozoon found in a Human Blood Smear.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1930. Sept. No. 306. [In Japanese. With 24 figs. on 1 plate. English summary pp. 58–59.] [Govt. Research Inst., Formosa.]

According to the English summary the flagellate was a Crithidia, with a small admixture of Leishmania and transitional forms, found in a blood-smear. "Suspicion must be thrown on their source." "Most likely . . . the ever-present Lucilia had selected the spout of the distilled-water flask for having a drink."

A. A.

NYASALAND PROTECTORATE. **The Medical Entomologist's Report for 1929** [LAMBORN (A. W.)].—*Nyasaland Protectorate Ann. Med. Rep. on Health & San. Condition for Year ending 31st December, 1929.* Appendix I. pp. 38–41.

Much interesting information is contained in this clear and concise report. In a tsetse-fly reconnaissance in the upper Likuni valley in July (the cool season) *Glossina morsitans* was found in open grass country almost equally as in woodland. This confirms an observation made in June by Game Warden WOOD, and an earlier observation reported by the author in 1928. Clearings were made in certain parts of the Likuni valley where it is hoped that considerable settlement will follow, since the soil is suitable for tobacco, and other inducements have been offered to native settlers—a rebate of hut-tax, and a rifle to each village, portending meat.

In connexion with malaria problems an attempt was made to find out how mosquitoes—particularly Anopheles—so numerous in the hilly country during the wet season, survive the dry season of their discontent. It was found that in the dry season the eggs of Aedes aestivate there (as elsewhere) in the dry debris of rot-holes, and the eggs of other local culicids in the humus of hollows in the ground and in the rocks. These and certain other suggestive observations tend to justify the surmise that the eggs of the local Anopheles have a similar aestivation.

Experiments on a large scale were continued on the possibility of a cyclic transmission of trypanosomes by arthropods other than Glossina; experiments with Ornithodorus and Cimex were unsuccessful. In the course of securing a constancy of fresh-emerged "clean" Tabani for a continuation of these experiments the seasonal bionomy of the local species of Tabanus was made clear, from an absence of the flies in the late rains and a great scarcity in the earlier part of the dry season, to a vexatious and aggressive abundance between the beginning of October and the end of December. An interesting discovery was made also that preparatory for pupation the larva of *Tabanus biguttatus* fashions out of the still plastic mud of its dried pool a cylindrical mud pillar which it then excavates so as to convert it into a cylindrical pupa-chamber. Exit from this chamber preparatory for the issue of the imago must (it is surmised) be effected by the spines at the top of the pupa-case. The function of the definitely compacted pupa-chamber is, no doubt, to protect the pupa from exposure when the hardening mud of its environment cracks and yawns. In one dried bottom the author collected 109 of these cylindrical pupating chambers. The fact that this common species has this habit and thus has definite breeding-

places where the individual puparia can be recognized is of obvious importance in the question of its control.*

A. A.

CEYLON. **Report of the Medical Entomologist for the Year 1929** [CARTER (Henry F.).]—*Ceylon Administration Rep. Director Med. & San. Services, 1929.* Appendix pp. C61–C65.

This is a copious and concise report of a wide and purposeful routine animated by the spirit of research. In the quest for naturally infected malaria-carriers, 1,468 anophelines, representing 7 species, caught during the year in houses and cooly-lines in different parts of the country were dissected, and 38 of them, all of the species *Anopheles culicifacies*, were found to be infested with oocysts or sporozoites, or with both ; infested specimens were caught in every month except June, July, August and October. In the course of surveys of breeding-grounds in various places larvae of the dangerous species *listoni* and *culicifacies* have been observed in streams and rivers (when not in flood) and occasionally even in parts of streams where the water is of varying degrees of salinity, in irrigation channels, in rice-fields, in trenches (except those fresh cut and those containing much vegetable debris) in coconut plantations, and occasionally in ponds and pools ; they appear to be little fastidious. Routine survey work includes " investigatory " surveys of the results of mosquito-malaria control work, the investigations being made by an experienced field assistant whose standardized observations are methodically checked and recorded and charted. In control operations the substitution of properly prepared slaked-lime for coir-dust as a vehicle for distributing Paris green promises to be an improvement. In addition to a wealth of detail relating to mosquito-malaria surveys, the Report also includes references to progress of the departmental museum, to courses of lectures and demonstrations to medical, sanitary, and other officers, and to an ever-swelling flood of material to be examined and identified in confederation with the department of Anti-malaria Campaigns. Among miscellanea are mentioned a minute black midge, *Lasiohelea stimulans*, usually mistaken for the " eye-fly," which appears at certain times and bites persistently ; and to the small Staphylinid beetles, *Paederus alternans*, whose irritant secretion causes dermatitis. Experiments show that the inflammatory reaction may be delayed as much as 3 days.

A. A.

IMPERIAL INSTITUTE OF ENTOMOLOGY. **Report of the Third Imperial Entomological Conference 17-27th June, 1930.**—59 pp. 1930. London : 41, Queen's Gate, S.W.7. [2s.]

The Third Entomological Conference, which sat in London from the 17th to the 27th June, 1930, included 33 delegates representative of the Overseas Empire in Africa, Australia, Canada, Ceylon, Cyprus, Federated Malay States, Fiji, India, New Zealand, Straits Settlements, Trinidad, and West Indies. Of the nine subjects set for discussion two —Tsetse Control and Biological Control of Insects—come within the purview of medical entomology. On the subject of tsetse control

* See also *Proc. Roy. Soc.*, Ser. B., Vol. 106, p. 83.

SWYNNERTON gave an account of his work in Tanganyika Territory—(1) research and (2) experimental reclamation by large scale clearing, late firing of grass, followed by settlement, organized through native tribal co-operation. It had been " fairly proved " by observation that in Tanganyika fly " centres " or " concentrations " were the feeding-grounds of the flies, " to which they resorted when hungry—all the year round." Experiments in poisoning vegetation, in dense planting of trees, and other treatment of the breeding-gounds of the flies were mentioned, as also the question of diverting or game-fencing lines of traffic through fly-belts. A continuous line of dense thicket has been found to act as an alternative or an adjuvant to a game barrier. In discussion, LLOYD's communication from Nigeria stated that in that country removal of heavy bush from the foci of *Glossina palpalis* and *tachinoides* was effective, and that field work has concentrated on clearings round threatened towns and important fords, and removal of the population from infested tracts that are too deeply eroded by ravines to permit clearing. CHORLEY said that in S. Rhodesia the population is much too scanty to justify a present policy of clearing, and the savannah grass too short to supply annual fires ; broad game barriers, within which the game is shot, is the present practice. LAMBORN said that in Nyasaland of perennial streams there is no seasonal concentration of game and therefore no concentration of fly for attack ; moreover, the population is too scarce and the tribal authority too weak for organized clearing. Hale CARPENTER for Uganda advocated concentration of the native population in bigger settlements. Organized grass-burning against *G. morsitans* was there not practicable, since there are two wet seasons. In the summary, the special difficulties in S. Rhodesia and Nyasaland were recognized, and admiration for SWYNNERTON's methods, based on native tribal co-operation, was expressed.

On the subject of Biological Control of Insects by predatory creatures two voices raised a plea in favour of Megarhinus larvae *versus* mosquitoes that breed in holes in trees, and were answered from Hawaii and India in tones of disparagement. SWYNNERTON indicated the difficulties of the attempt to control Glossina by biological means. [No one seems to have clearly argued, in well-defined terms, the difference between reasoned biological control under the tame conditions established by man, and blind attempts at biological control in the unrestricted welter of the natural environment.]

A. A.

MARTINI (E.). Klima und Seuchen vom Standpunkte des Entomologen. [**Climate and Infection from the Entomological Standpoint.**]—*IV. Internat. Congress of Entom., Ithaca, Aug. 1928.* Vol. 2. 1929. pp. 463–477. With 2 text figs. [Inst. for Ship & Trop. Diseases, Hamburg.]

This is a discourse before an international congregation of entomologists assembled at Ithaca in 1928. The teacher observes the legions of the Insects disputing the sovereignty of man, and concentrates on those that assail the paragon of animals himself by spreading his specific infections. But insects are not almighty. Climate sets bounds to their range and activity ; and it is on climate that the lecturer dilates—since the insect excitants and transmitters of infections " belong for the most part to a flora and fauna that depend on climate " (gehören grossenteils zur klimatisch bedingten Flora und Fauna). This gives the

discourse an academic rather than a practical bent. Moreover, as Darwin long ago argued, in the struggle for existence climate acts in main part indirectly, often by favouring or by obstructing some species quite remote in the zoological scale from the species ultimately affected; and it is not this complex indirect effect of climate—which too often the impatient "practical" man is inclined to ignore—that is here considered, but rather the direct effects of warmth, the adverse influence of a dry atmosphere and the propitious influence of a moist atmosphere on insect life, and the vitally protective value of chitin. The address, in short, as its title indicates, is a review from an entomological standpoint, and one of its main conclusions, suggesting that the light thrown by medical entomology on the originative processes of infective disease has almost eclipsed that formerly furnished by pure bacteriology, must have gratified the assembled entomologists—albeit that "comparisons are odorous." A. A.

KEMPER (Heinrich). Beobachtungen ueber die Wirkung von Insektenstichen. [**Observations on the Effects of Insect-Bite.**]—*Arch. f. Dermat. u. Syph.* 1930. June 14. Vol. 161. No. 1. pp. 127–145. With 6 text figs. [38 refs.]

This is a summary review of recent publications on what one must call insect-bite, since it refers to wounds inflicted by the mouth-parts and does not include stinging insects. It is dermatology as influenced by serology rather than as advanced by entomology or zoology. The biting insects included are the bedbug, *Aedes aegypti*, the waterboatman (Notonecta), the stable-fly (Stomoxys), the flea, and Ceratopogon. It concludes with a few "general remarks on the problem of *Stichwirkung*." A. A.

SCHWETZ (J.). Sur quelques diptères hématophages du Congo. [**Some Bloodsucking Flies of Congo.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 987–994. [3 refs.]

In Belgian Congo "all the little beasts that prick" are called "maringoins," and the author here mentions some of them and says something about them. *Phlebotomus africanus*, *P. collarti*, *P. simillimus*, *P. schoutedeni*, and *P. schwetzi* (minute and diaphanous, the only one of them that also feeds on cold-blooded animals); *Culicoides grahami* (very minute, the most widely distributed species, sometimes occurring in swarms along with *Simulium damnosum*), *C. inornatipennis*, and *C. milnei* (which so far has been found only in native huts, and is said to bite at night); *Simulium damnosum* (common, occasionally trespassing into houses alongside rivers). The author states that *Filaria perstans* and onchocercosis occur in Belgian Congo and that leishmaniasis is unknown there. A. A.

TAYLOR (A. W.). **The Domestic Mosquitos of Gadau, Northern Nigeria, and their Relation to Malaria and Filariasis.**—*Ann. Trop. Med. & Parasit.* 1930. Oct. 22. Vol. 24. No. 3. pp. 425–435. With 1 chart in text. [5 refs.]

An interesting report. The climate of Gadau is dry; the average annual rainfall is 28 inches, all between April and October. Mosquitoes

generally are numerous only from July to November. [In November and December and in April and May of the respite no figures are recorded, the author having been away from the Station during the first two of these months.] During the term June 1929 to March 1930 (with those interruptions) only 74 culicines were taken in daily catches from *European* bungalows, against 2,134 anophelines. Of the anophelines 47·2 per cent. were *A. costalis* (84·7 per cent. of them caught in August and September) and 44·2 per cent. were *A. funestus* (95·4 per cent. of them caught in August, September, and October); the remaining 8·6 per cent. were composed of *A. squamosus* (3·7), *A. pharoensis* (2·2), *A. mauritianus* (1·7), *A. rufipes* (0·6), and *A. nili* (0·4). Of the 74 culicines nearly half were *C. nebulosus.*

Dissections of 3,563 anophelines and 117 culicines were made. *A. costalis* and *A. funestus* are the only species that were proved to carry malaria parasites. The first infection of *costalis* appeared in June; of *funestus* in July—in both cases both sporozoites and zygotes. Considerable fluctuations of the sporozoite-rate were observed in both species during the rains. Both *A. costalis* and *A. funestus* are also heavily infected with *Filaria bancrofti*, both in the European and the African quarters of the Station. A mature filaria infection was seen in an individual *Aedes ochraceus*, and some infections of the thoracic muscles in *A. pharoensis* and *A. squamosus.*

Some other parasites of mosquitoes are casually noticed—nematodes in gut and body cavity in several species of Anopheles; nematode ova (?) in ovaries of *A. costalis*; sporiferous cysts in wall of mid-gut of *A. costalis* and *A. funestus*; a heavy infection of small oocysts (*Plasmodium praecox* (?) zygotes) in *Lutzia tigripes*, and also in this species, a Herpetomonas infection; and a heavy Spirochaete infection of the midgut in a *Culex nebulosus.* A. A.

HANCOCK (G. L. R.). **Some Records of Uganda Mosquitoes and the Oecological Associations of their Larvae.**—Reprinted from *Bull. Soc. Roy. Entom. d'Egypte.* 1930. New Ser. No. 1. pp. 38–56. With 9 figs. on 5 plates. [25 refs.]

These notes, it is stated, are recorded not so much for the diffusion of knowledge as for affording some necessary guidance to the entomologist recently appointed to the local Medical Department. "They are unavoidably fragmentary, and are intended . . . to serve as a basis for future work." Although not entirely novel, they are extremely interesting and to the point, and will admirably fulfil their purpose. Attention has of course been given to breeding-waters of anophelines, which are summarily classified. The local observations support those made elsewhere that waters visibly charged with iron-hydroxide are unsuitable for anopheline larvae, and that (in the absence of this particular impurity) the special breeding-waters for all anophelines, except *implexus*, were swamps, selvedge of lakes and sluggish streams, ditches, pits, water-holes, and wells. The elements of the microflora have been carefully noted, also the predaceous fishes, water-bugs and water-beetles and dragon-fly larvae, although, in the absence of specialists, not yet specifically identified. Among house-haunters *gambiae* (*costalis*) is noticed as the commonest Anopheles, followed by *funestus*, both being notorious malaria carriers. A list of the local Culicidae is appended, the Culicinae identified by EDWARDS. A. A.

SCHWETZ (J.). Les moustiques de Stanleyville (Congo Belge). [**Mosquitoes of Stanleyville.**]—*Ann. Soc. Belge de Méd. Trop.* 1930. Mar. 31. Vol. 10. No. 1. pp. 25–65. With 9 figs. on 6 plates & 1 map. [1 ref.] [Parasit. Lab., Stanleyville.]

Stanleyville stands on the northern bank of the Upper Congo, almost on the equator, in the very middle of Africa. This well-illustrated paper contains lists of the mosquito-species bred and caught in Stanleyville and its suburbs in the course of a year, but is chiefly taken up with their different types of breeding-places and their specific aquatic vegetation, and their distribution in houses and huts in different parts of the town. It is notable that of the species commonly captured in dwellings, several do not breed in the vicinity of dwellings; thus *Culex rima*, one of those most frequently caught in European houses, was only once bred from the collections of larvae. On the other hand, several of the species most frequently bred from larvae were never caught either in houses or in huts—this was notoriously the case with *Aedes vittatus*. A curious fact is that *Aedes argenteus*, very common in collections of larvae and frequently caught in European houses, was not once found in a native hut. As a rule more mosquitoes, and in greater variety, are caught in native huts than in European houses, and while the European house-haunters are chiefly culicines, anophelines (and sometimes Mansonioides with them) predominate in native huts; sometimes, indeed, of dozens of the insects caught in a native hut all may be Anopheles. These are facts of general interest.

A. A.

HAMLYN-HARRIS (R.). **The Consideration of Certain Factors as Potentialities in Mosquito Control in Australia.**—Reprinted from *Proc. Roy. Soc. Queensland.* 1930. Nov. 13. Vol. 42. No. 10. pp. 86–105. With 8 text figs. & 4 figs. on 2 plates. [25 refs.] [Entomol. Section, Health Dept., Brisbane.]

The following conclusions from the author's observations in the field and laboratory (which are given in detail) are to be noted:

Mosquito breeding-places are definitely selected, and if the insects' attraction to "such places as have a distinct hay infusion" quality be significant the attraction may be determined in part by food-supply. Toxic decomposition-products in the water greatly influence the growth and survival of larvae; albuminoid ammonia, however, insures a bountiful food supply for those of *Culex fatigans*. Larvae can live for a long time without oxygen from the atmosphere. Characeae have no lethal effect on larvae, in the field. "The waters of the [local] rice-fields though conducive to breeding are not selected at the commencement of the season"; the drainage ditches of the Murrumbidgee Irrigation Area are particularly productive of *Anopheles annulipes*. Hp requires careful consideration; it varies with diurnal variations of temperature.

A. A.

HAMLYN-HARRIS (R.). **Halticinae (Col.) as Possible Factors in Natural Control of Mosquitoes in Queensland.**—*Bull. Entom. Res.* 1930. July. Vol. 21. Pt. 2. p. 159. [Health Dept., City Council, Brisbane.]

In a polluted canal near Brisbane that had become clogged with water-weed during a dry spell and crowded with larvae of *Culex fatigans*, it was

noticed that wherever *Jussiaea repens* was flourishing large patches of this plant were killed and blackened by swarms of a small flea-beetle, *Haltica ignea* Blackb.; the water, too, around these patches was discoloured, and all the Culex larvae in them were dead, though those outside them were quite active. Opportunities of further observation were swept away by sudden floods. The author, however, offers the observation to the profession, mentioning in addition that apart from it he had noticed the excreta of *Haltica ignea* to be poisonous.

A. A.

MacGregor (Malcolm E.). **The Nutrition of Adult Mosquitoes: Preliminary Contribution.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1931. Jan. 31. Vol. 24. No. 4. pp. 465–472. [6 refs.] [Wellcome Entom. Field Lab., Wisley, Surrey.]

The author first draws attention to the two methods of imbibing food practised by mosquitoes, namely steady suction, as when the piercing mouth-parts are thrust through the skin in sucking blood; and "discontinuous suction," as when the tip of the proboscis is used in collecting fluids other than blood. When blood is fairly sucked ("aspirated") it passes direct to the stomach, the reaction of which is acid; when fluids other than blood are, as it were, sipped (for in this act of feeding the insects "repeatedly withdraw the tip of the proboscis from the fluid and reinsert it at other sites") they pass gradually to the oesophageal diverticula, the reaction of which is alkaline. (He also refers to his method of artificial feeding of mosquitoes, and mentions, incidentally, that by this method males have been found to imbibe blood as readily as females and to digest it as promptly.)

The application of his studies of the different mechanisms of feeding has led the author to the following interesting physiological observations.

Pure *virgins* of *Aedes aegypti* a few days old will bite, as is well known, and will fill to repletion either on blood or on a variety of juices. If they bite and suck blood the blood passes to the stomach direct, stimulation of the ovaries follows, and usually eggs are laid; the eggs are normal in appearance, "but have always been found to be infertile." [It is not pedantic to remark, seeing that a good deal has been written about unduly prolonged delay in the hatching of certain of the eggs of this species, that the author seems not to have experimented with some of the incubatory stimulants of those nonconforming eggs (see this *Bulletin*, Vol. 27, p. 310).] If, however, the virgin insects "take food of any kind primarily into the diverticula," by discontinuous suction, "ovulation never occurs." Furthermore: If *fertilized* females of *Ae. aegypti* bite fairly, the whole of the ingested blood passes direct to the stomach, and the production of fertile eggs follows 3 or 4 days afterwards. But if fertilized females are fed artificially on blood containing a trace of honey or other sugary matter, the mixture passes to the diverticula and is rapidly digested without any concurrent effect on the ovaries. Sometimes, however, especially in the case of individuals that have previously laid eggs, activity and development of the fat-body follows. [These observations should be compared with those of Chodoukine on Anopheles in Turkestan; this *Bulletin*, Vol. 27, pp. 906–907.]

The author has not reported any corresponding experiments with *Culex pipiens*. In his experience it is very difficult to get this species

to bite in England, but all his experiments with it " seem to indicate conclusively that blood is an essential constituent of the food supply for the inception of ovulation." On the contrary, ROUBAUD in France has described [see this *Bulletin*, Vol. 26, p. 808] a race of *C. pipiens* whose females, without getting any food at all in the adult state, produce a succession of generations through the winter [DE BOISSEZON, see this *Bulletin*, Vol. 27, pp. 296, 297, has described a similar phenomenon in France for this species, and HUFF also, *ibid.*, pp. 310, 311, in America]. In the author's experience, females of *C. pipiens* showing the maximum development of the fat-body can be fed artificially either on blood, or on a mixture of blood and honey, or can be induced to take other mixtures by " discontinuous suction " ; but all that follows is digestion of the food without either activation of the ovaries or hypertrophy of the fat-body. Nothing else happens if the insects are incubated at 30° C. for 2 or 3 weeks, to insure the reduction of the fat body, before the feed, or even after several meals have been taken and digested. [Here also Cp. this *Bulletin*, Vol. 27, pp. 906, 907].

As this is a preliminary contribution the matter may be left for further investigation.

A. A.

HOWLAND (L. J.). **The Nutrition of Mosquito Larvae with Special Reference to their Algal Food.**—*Bull. Entom. Res.* 1930. Dec. Vol. 21. Pt. 4. pp. 431–439. With 3 text figs. & 4 figs. on 1 plate. [11 refs.] [School of Hyg. & Trop. Med., London.]

With an idea of discovering the value of algae as food (or as convivae of some kind) for mosquito larvae the author carried on much experimental investigation—on the changes undergone by various types of algae in the larval gut, and on larval digestion of algae *in vitro* ; on the penetration of various stains into algal cells both before and after digestion, and into digestive cells of larvae ; on rearing of larvae in a variety of solutions (from distilled sterilized water to filtered pond water), some without algae and some with algae either living or dead ; and on the histology of the larval gut after a diet of algae. As the author states it, " From these methods of approach . . . the whole question of the importance of algal food to the larva is very involved." The author's own summary, which is not very rich in novelties, is as follows :—

" 1. Algae are ingested by many species of mosquito larvae and appear to form an important part of the food of these larvae.

" 2. The algae are digested in the gut, but the digestion is often by no means complete.

" 3. It is quite possible that the rôle played by the algae may also be assumed by other forms of organic matter, for larvae may be reared to maturity in solutions containing little or no algae.

" 4. Different algae react differently in the guts of the larvae, some being noticeably digested and some hardly at all.

" 5. Those algae which are digested the most are easily stained and are forms of low osmotic pressure.

" 6. Cytological investigation revealed no character that indicates that algae are an especially nutritious diet."

A. A.

HINMAN (E. Harold). **A Study of the Food of Mosquito Larvae (Culicidae).**—*Amer. Jl. Hyg.* 1930. July. Vol. 12. No. 1. pp. 238–270. [5 pages of refs.] [Entomol. Dept., Cornell Univ., Ithaca, N.Y.]

From a study of the gut of over 600 mosquito larvae of 17 species —1 Anopheles, 8 Aedes, and 8 other culicine species—and from incidental sections of Aedes and Culex larvae, the author concludes that mosquito larvae swallow anything that is small enough to pass through the mouth and that much of what is swallowed cannot be food. He therefore discountenances the theory of preferential feeding. He further observed living and active protozoa and rotifers " well back in the intestine," but attempts to recover pure cultures of bacteria from the intestinal tract " gave inconclusive results." Experiments in rearing larvae in autoclaved water taken from breeding-places, and in adding certain species of bacteria to such autoclaved water are described. But what appear to the reviewer the most wonderful of all the experiments are those in which " eggs of this species [*Aedes aegypti*], sterilized on the exterior, have been introduced into Berkefeld filtered water, and normal adults have emerged in 8 or 9 days (the usual time for transformation under the most favourable conditions)." From these experiments the author suggests the possibility that mosquito larvae and other aquatic animals can normally make use of solutions and suspended colloids—a suggestion originated, as he points out, by PÜTTER, whose papers (in title) are specified in the bibliography. [The suggestion seems sufficiently strange—but distinguished experimental zoologists of this century have suggested theories even more startling, and hardly a philosopher is left to know that he knows nothing.]

A. A.

ROUBAUD (E.). Sur l'existence de races biologiques génétiquement distinctes chez le moustique commun *Culex pipiens.* [**Genetic Biological Races of** *Culex pipiens.*]—*C.R. Acad. Sci.* 1930. Dec. 22. Vol. 191. No. 25. pp. 1386–1388. [1 ref.]

In respect of *Culex pipiens* the author would distinguish two " biological races," the ordinary race (styled by him " heterodynamous ") rural in habit and constrained to suck blood and to hibernate ; and a cockney race (styled " autogenous ") restricted to a city life, which continues breeding throughout winter even when blood is not to be obtained. The author states that he has bred twenty generations of the " autogenous " (or " homodynamous ") race in the same cage without supplying any nourishment whatever to the adults. In crossing the " autogenous " or " homodynamous " race with the " heterodynamous " race he found that the " autogenous " peculiarity was absent from the resulting hybrid generation but reappeared in some of the females of the second hybrid generation.

[With regard to the " autogenous " race see the author's paper noticed in this *Bulletin*, Vol. 26, p. 808. With regard to *Culex pipiens* breeding without interruption throughout the winter and without feed of blood see BOISSEZON in Vol. 27, p. 311 ; and without blood and without any food at all see HUFF in Vol. 27, p. 310.]

A. A.

ROUBAUD (E.) & TOUMANOFF (C.). Intoxications d'encombrement, chez les larves de Culex vivant en milieu non renouvelé. [**Intoxication of Overcrowding, of Culex Larvae living in a Medium not Renovated.**]—*Bull. Soc. Path. Exot.* 1930. Nov. 12. Vol. 23. No. 9. pp. 978–986. [3 refs.]

The authors' conclusions from a variety of laboratory experiments are that accumulation of excreta of mosquito-larvae overcrowded in a deficiency of water retards or arrests the development of larvae, particularly in their 4th stage. This toxic effect of the excreta is increased at higher temperatures, and when the toxic accumulation is great it may be fatal. At lower temperatures, and as the overcrowding and the supplies of toxic material gradually diminish, surviving larvae though weakened may slowly recover and ultimately complete their evolution. In this delayed larval development due to an unfavourable medium the authors see the analogy of the autumnal " diapause " necessitating a " hibernal reactivation " of many types of insects.

A. A.

HUFF (Clay G.). **Individual Immunity and Susceptibility of** *Culex pipiens* **to Various Species of Bird Malaria as studied by Means of Double Infectious Feedings.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 424–441. [23 refs.] [Med. School, Harvard Univ., Boston.]

In this study of individual susceptibility to bird malaria in *Culex pipiens* canaries individually infected variously with *Plasmodium cathemerium*, *P. elongatum*, or *P. relictum* were used for feeding the insects. Of a large number of insects fed to repletion on infected birds, 176 were set aside, fed on moist raisins, allowed to oviposit, and subsequently—" within a few days "—allowed to feed again on an infected bird, irrespective of the strain of infection carried by the bird ; 132 survivors of the two feedings were dissected 6 or 7 days later. It turned out that it was possible for some individuals to become infected with two species of parasites, for some to escape infection by one species and became infected by another, and for others to escape infection altogether. " Two separate feedings on the same species of parasite brought the result that each individual either became infected both times or failed entirely to become infected (two exceptions out of sixty)."

" The presence of oocysts and their appearances were used as a means of determining whether or not each individual had or had not become infected with each parasite."

A. A.

ST. JOHN (Joe H.), SIMMONS (James Stevens) & REYNOLDS (Francois H. K.). **The Survival of Various Microörganisms within the Gastro-intestinal Tract of** *Aedes aegypti*.—*Amer. Jl. Trop. Med.* 1930. July. Vol. 10. No. 4. pp. 237–241. [2 refs.] [Bureau of Science, Manila, P.I.]

The authors describe their technique and their experiments and mention that J. T. DUNCAN, although successful with a number of other insects and arachnoids, found that bactericidal action was feeble and also limited in range in *Aedes aegypti*. In their own experiments *in*

vitro tests for germicidal action in the gut-secretions of this insect were negative for *Bact. typhosum* and *Chromobact. prodigiosum.* Their experiments *in vivo* showed that *Chromobact. prodigiosum, Myco. leprae, Staphylococcus aureus,* and *Cytoryctes variolae* survived in the gut of this insect for at least 24 hours but " could not be demonstrated after an interval of seven or more days." They conclude, therefore, that the microbes in question were not killed by an " active bactericidal principle " but either were slowly digested or excreted. In any case they allow that dangerous transference of the microbes to man would be unlikely except by frequent interrupted feedings of the insect and by contact with broken skin.

A. A.

McKinley (Earl B.) & Douglass (Margaret). **Further Note on the Salivary Gland Poison of** *Aëdes aegypti.*—*Proc. Soc. Experim. Biol. & Med.* 1930. May. Vol. 27. No. 8. pp. 845–846. [1 ref.] [School of Trop. Med., Univ. of Porto Rico, San Juan.]

This is a minutely academic study in amplification of the senior author's earlier paper on the subject (this *Bulletin*, Vol. 27, p. 310). The authors now state that " chemical tests indicate the carbohydrate nature of the toxic substance [in the salivary secretion of *Aedes aegypti*] and the skin reactions obtained . . . are quite similar to those obtained with carbohydrates isolated from certain microorganisms."

A. A.

Martini (E.) & Achundow (I.). Versuche über Farbenanpassung bei Culiciden. [**Experimental Observations on Adjustive Colouring of Culicidae.**]—Reprinted from *Zool. Anzeiger.* 1929. Vol. 81. No. 1/4. pp. 25–44. With 7 text figs. [3 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

This long paper deals in punctilious detail with the reactive and adjustive modifications of colouring—modifications which may influence also the colouring of pupa and imago—observed in larvae of four species of mosquitoes and of a Corethra reared in darkness or in vessels of different colour. It is an isolated study in a limited tract of a biological field that is as extensive as life itself.

A. A.

Sinton (J. A.) & Kehar (N. D.). **A Field Method for the Estimation of the Salinity of the Water in Mosquito-Breeding Places.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 199–201. With 1 text fig.

The authors describe the conversion of a graduated 10 cc. delivery pipette into a tube by cutting off the mouth-piece and sealing that end and cutting off also the pointed delivery-end. The pipette (inverted) is now a graduated test-tube. Along with it are carried into the field standard solutions of silver nitrate and a saturated solution of potassium chromate for the estimation of dissolved chlorides. For all the detail which the authors think necessary the original paper must be consulted.

A. A.

RICHARDSON (Charles H.) & SHEPARD (Harold H.). **The Effect of Hydrogen-ion Concentration on the Toxicity of Nicotine, Pyridine, and Methylpyrrolidine to Mosquito Larvae.**—*Jl. Agric. Res.* 1930. Aug. 15. Vol. 41. No. 4. pp. 337–348. With 3 text figs. [25 refs.]

A fine-spun comparative study of the toxicity for mosquito larvae (*Culex pipiens*) of solutions of nicotine as a base and as a salt, at various pH values and at different concentrations. As a result it appears that in solutions the free base is much more toxic than the sulphate, and that the "nicotine enters the body chiefly through the mouth as molecules or ions in solution rather than as molecules in the gaseous condition." A few experiments with pyridine and with methylpyrrolidine are recorded also, and a few recorded observations on the comparative effects of nicotine as a base and as a salt on animals other than insects are noticed.

A. A.

EDWARDS (F. W.). **Mosquito Notes. IX.**—*Bull. Entom. Res.* 1930. Oct. Vol. 21. Pt. 3. pp. 287–306. With 8 text figs.

Descriptive and taxonomic entomology. *Anopheles walravensi* from the Belgian Congo, *A. multicinctus* and *A. garnhami*, both from Kenya, are described as n. sp. The anophelines Chagasia and Bironella are promoted to generic rank, and the *Bironella travestita* of Brug is separated as a subgenus *Brugella*.

A. A.

ROUBAUD (E.) & TOUMANOFF (C.). Essais d'infection expérimentale de larves de Culicides par quelques champignons entomophytes. [**Experimental Infection of Culicid Larvae with Entomophyte Fungi.**]—*Bull. Soc. Path. Exot.* 1930. Dec. 10. Vol. 23. No. 10. pp. 1025–1027. With 1 text fig. [3 refs.]

Larvae of *Culex pipiens* and *Anopheles maculipennis* experimentally infected with spores of the fungi *Beauveria bassiana* and *B. globulifera* took infection which was fatal to some of them.

A. A.

MIYAMOTO (S.). Ueber Geckonen als Moskitofänger. [**Culicivorous Gecko-Lizards.**]—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1930. Oct. No. 307. [In Japanese. German summary p. 61.] [Med. School, Taihoku.]

Five Japanese house-geckos caged individually from 14 to 30 days were observed to capture individually from 43 up to 59 *Culex fatigans per diem*.

A. A.

BONNE-WEPSTER (J.). Het geslacht *Taeniorhynchus* (*Arribalzaga*) in Nederlandsch Oost-Indië.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Sept. 1. Vol. 70. No. 9. pp. 940–965. With 18 figs. (2 coloured, on plates).

——. **The Genus** *Taeniorhynchus* (*Arribalzaga*) **in the Dutch East Indies.**—*Meded. Dienst d. Volksgezondheid in Nederl. Indië.* 1930. Vol. 19. Pt. 2. pp. 196–212. With 18 figs. (2 coloured) on 10 plates. [Med. Lab., Weltevreden.]

The fact discovered by BRUG and DE ROOK, that Taeniorhynchus species are transmitters of *Filaria malayi*, increases the actual importance of further knowledge of this genus. The author intends to give a full des-

cription of it, beginning in this article with the subgenus *Mansonioides* Theob.

W. J. Bais.

KALANDADZE (L.). Zur Fauna der Stechmücken in Georgien UdSSR. [**Culicidae of Georgia U.S.S.R.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1931. Feb. Vol. 35. No. 2. pp. 110–113. [12 refs.] [Georgian Inst. for Trop. Diseases, Tiflis.]

A bare list, with the local provenance of each species, of 26 mosquitoes actually identified as occurring in Georgia. The species of Anopheles are *maculipennis, elutus, bifurcatus, nigripes, algeriensis, hyrcanus* var. *pseudopictus*, and *superpictus*. The only noteworthy culicine is *Aëdes aegypti*.

A. A.

BOYD (Mark F.). **Studies on the Bionomics of North American Anophelines. VI. Some Observations on Imagines.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 449–466. With 1 text fig. [8 refs.] [Station for Field Studies in Malaria, Edenton, North Carolina.]

The purpose of this paper is to record studied observations that bring to light the dangerous malaria-carriers among the anophelines of N. Carolina. The common species there are *Anopheles quadrimaculatus, A. punctipennis*, and *A. crucians*. From diverse observations here recorded it is concluded that *A. quadrimaculatus* is an effective and apparently the only local transmitter of malaria; it has avidity for human blood, and after feeding to repletion it continues to shelter in the vicinity of its hosts until the time of oviposal. It does, however, feed freely on cattle, and there is some evidence suggesting that the presence of cattle near dwellings may thus be protective from malaria. All adults encountered in the late autumn and winter were "in a state of hibernation." The other two species do "not appear to be implicated in the local transmission of malaria." *A. punctipennis* has a tendency to linger after feeding, and a small proportion appear to have fed on man; it does not hibernate completely. *A. crucians* matures its ova "in a feral environment."

A. A.

LAUREL (Alberto G.). **Identification of Ingested Blood in the Stomachs of Anopheline Mosquitoes by Means of the Precipitin Test.** [**Preliminary Study.**]—*Monthly Bull. Philippine Health Serv.* 1930. Apr. Vol. 10. No. 4. pp. 153–166. [11 refs.]

This paper is occupied chiefly with matters of ordinary technique. In the actual tests 7 of 8 specimens of *Anopheles minimus*, 1 of 31 *A. hyrcanus*, 1 of 13 *A. rossii*, and the one available specimen of *A. karwari*, reacted to human blood. Not one of 13 specimens of *A. barbirostris*, of 6 specimens of *A. philippensis*, of 3 *A. fuliginosus*, or of 2 specimens of *A. maculatus*, reacted to human blood. With the exception of *A. minimus* all the other species reacted (45 instances collectively) to cow blood, and there were 2 or 3 reactions to horse blood—besides the "no reactions."

A. A.

ADOWA (A. N.) & SEBENZOW (B. M.). Ergebnisse der 3-jährigen Tätigkeit der hydrobiologischen Abteilung in der Erforschung der Ökologie der Anopheleslarven an den Torfgewinnungsstellen. [**Oecology of Anopheles Larvae in Peat-cutting Districts.**]—*Ztschr. f. angewandte Entom.* 1929. Vol. 15. pp. 170–177. [22 refs.] [Trop. Inst., Moscow.]

For three years the authors and some others have been studying and comparing from the anopheles-malaria standpoint the bogmoss (Sphagnum) marshes and the sedgy (Carex) marshes of the peatmosses near Moscow. The main conclusions of these studies have been noticed from time to time in this *Bulletin* (Vol. 24, p. 883 ; Vol. 25, pp. 814, 815 ; Vol. 26, pp. 812, 814) and the authors' summarized experience has been abstracted at some length here (Vol. 27, p. 298). The present paper is the authors' German summary, and restates their final conclusions—emphasizing again the practical importance of the determination of the pH concentration, the oxygen tension, and the electrical conductivity of the water as indications of its fitness or unfitness for Anopheles larvae.

A. A.

BRIGHENTI (Dino). Ricerche sulla attrazione esercitata dai colori sugli anofeli. [**Studies on the Colour-Attractions of Anopheles.**]—*Riv. di Malariologia.* 1930. Vol. 9. 10 pp. With 2 text figs. [28 refs.]

An account of 43 observations carried out during June-September in a malarial district with many *A. maculipennis*, near Ferrara. Two byres were divided into stalls each for two animals. These stalls were painted in different colours—blue, grey, red, white, yellow, green and violet. The mosquitoes in each stall were counted. Previous laboratory experiments (NUTTALL, KÔ-RAN and others) had shown that the colours proved attractive in the order yellow, red, white, but under the conditions of the author's investigations results quite different were obtained. The numbers found in each stall are given in the paper, but the results may be briefly summed up by stating that red proved far the most attractive, violet and light yellow coming next in sequence ; cobalt blue and dark green attracted least. As regards grey contradictory results were obtained and the numbers varied according to the adjacent colour, the grey nearest red showing many more than the grey next to blue. White was more attractive than grey, but less so than any of the colours. The number on white appeared to depend largely on the illumination, ventilation and aspect.

H. H. S.

BRIGHENTI (Dino). Gli anofelini delle colonie italiane. (**The Anopheline Mosquitoes of the Italian Colonies.**)—*Riv. di Malariologia.* 1930. July–Aug. Vol. 9. No. 4. pp. 429–433. [9 refs.] English summary (2 lines) p. 477.

Of the Mediterranean colonies—Dodecanese (Aegean), Tripolitania and Cyrenaica—*A. pictus* (*A. hyrcanus*), *A. superpictus*, *A. bifurcatus*, and *A. maculipennis* are found in the first ; *A. maculipennis* is the commonest in the second, but *A. mauritianus* and *A. algeriensis* also are met with ; in Cyrenaica *A. maculipennis* and *A. multicolor* are seen but Culicines are more common, *Aëdes argenteus*, *C. pipiens* and *T. longiareolata*. In the Ethiopian colonies, *A. mauritianus*, *A. gambiae*, *A. pharoensis* and others have been recorded in Abyssinia, but in Eritrea *A. mauritianus* is the only one known to the author ; in Somalia, *A. costalis* and *A. funestus* are the chief.

H. H. S.

MANALANG (C.). **Morphology and Classification of the Philippine Variety of *Anopheles aconitus* Donitz, 1902, and *Anopheles minimus* Theobald, 1901.**—*Philippine Jl. Sci.* 1930. Oct. Vol. 43. No. 2. pp. 247–261. With 4 figs. on 1 plate. [28 refs.]

The author considers that the Philippine Anopheles which have been regarded hitherto as *A. minimus* are identical with *A. funestus* of GILES as amended by STRICKLAND, and that the local insects which have been regarded as a variety of *A. funestus* are a variety of *A. aconitus*; this variety he describes as new under the designation *A. aconitus* var. *filipinae* [*sic*]. A. A.

SCHIPITSINA (N. K.). **The Feeding of *Anopheles maculipennis* Larvae on the Colloids of Natural Water.**—*Bull. Inst. Recherches Biol. Univ. Perm.* 1930. Vol. 7. Pt. 4. pp. 171–190. [18 refs.] [In Russian. English summary pp. 190–194. With 4 curves.]

According to the English summary the main objects of the work here described are to determine: (1) whether or not larvae of *Anopheles maculipennis* can live and grow on the minute organic particles, chiefly colloids, of natural water, and (2) the quantity of water that a larva can strain through its mouth in a given time. Squads of 18 to 25 larvae were bred, under uniform conditions, in dishes each holding 80 cc. of water, of four kinds, namely: (1) the pond water of their local habitat, rich in minute and varied forms of seston* and dissolved organic matter; (2) the same water after passage through filter-paper, still containing bacteria and colloids, and dissolved organic matter; (3) the same water after passage through a Chamberland candle, still containing colloid particles and dissolved organic matter; (4) "artificial fresh water" containing "a poor quantity of organic substances and 787 bacterial colonies in 1 ccm." (Preliminary experiments had shown that larvae of the species studied swallowed particles of Chinese ink (1 μ to 0·1 μ) and of collargol.)

Larvae did not attain the fourth instar in any of the four media, their retarded growth and aborted fate being due to deficient food. Those in the restricted volume of pondwater naturally did better than those in the paper-filtered pondwater; and those in the Chamberland-filtered water, which contained only organic colloid particles, did better than those in the "artificial fresh water," which contained bacteria. The conclusion of the matter is that the organic colloids contained in water do contribute a distinct quotum to the food supply of the larva, but a quotum which—by experimental estimation of the amount of water that is passed through a larva's mouth in a given time—is not sufficient to sustain life. A. A.

VAN THIEL (P. H.). Hibernation et semihibernation de l'*Anopheles maculipennis* et de la variété *atroparvus*; un problème de l'anophélisme sans paludisme. [**Hibernation and Semihibernation of *Anopheles maculipennis* and the Variety *atroparvus*: Anophelism without Paludism.**]—*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 836–850. With 4 text figs. [12 refs.]

In Holland two kinds of *Anopheles maculipennis* are recognized, namely: (1) the typical form, which is larger, longer in wing, and does not suck blood, but runs to a fat-body in winter, which it passes in a state of complete inactivity, in corn-lofts, coach houses and houses;

* Seston (σηστόν)=sifted, i.e. filtered matter.

and (2) a smaller shorter-winged form (*atroparvus*), which does suck blood from time to time, but has the fat-body incompletely developed, in winter, which it passes in a state of partial activity (semihibernation) in houses and cattle-sheds of populous places. The variety *atroparvus* breeds in brackish waters, predominates in malarious tracts, and is believed to be a more continuously persistent and therefore more dangerously efficient malaria carrier than the typical freshwater-breeding long-winged *A. maculipennis*. [This subject has been reviewed again and again in this *Bulletin*, the latest notice being in Vol. 27, pp. 910–911. It appears now to be approaching a stage that lies rather outside the purview of Medical Zoology.]

The present paper deals chiefly with detail of seasonal development of the fat-body of *atroparvus*, and draws attention to a "group" of insects which by their wing-index and hibernating-places should be identified with *atroparvus*, but approach the typical *maculipennis* in the seasonal development of the fat-body. A. A.

GRITZAÏ (P. K.). Biologie de l'*Anopheles maculipennis* Mg. et mesures antianophéliques à la station malarique de Charkow. [**Biology of** *Anopheles maculipennis* **Mg. Antanopheline Measures at Kharkov.**] —*Bull. Soc. Path. Exot.* 1930. Oct. 8. Vol. 23. No. 8. pp. 795–797. [Th. Iatzenko Inst., & Malaria Station, Kharkov.]

In antimalaria work in and around Kharkov in 1926–27 anopheline larvae were found to be particularly abundant in clean waters rich in Spirogyra. Real success against the larvae depends on radical treatment of rivulets, ponds, springs, and all little and temporary collections of water. Rectification of the beds of the rivers only resulted in the appearance of anopheles larvae there where they had not been found before—to the author's astonishment. For sheets of water Paris green is better than petroleum since it is not so hurtful to forms of life other than Anopheles larvae. The presence of stabled cattle was found to mitigate the incidence of malaria. A. A.

MASSLOW (A. W.). Zur Biologie der *Anopheles maculipennis* Mg. [**Biology of** *Anopheles maculipennis*.]—*Ztschr. f. Angewandte Entomol.* 1930. Aug. Vol. 16. No. 3. pp. 592–596. [1 ref.]

An unexciting diary of the winter life of *Anopheles maculipennis* in Tomsk (Siberia). One observation of general interest is that the average length of life of the insects (16) resting on damp walls (90 per cent. moisture) was 56·4 days, whereas that of the insects (10) resting on dry walls (35 per cent. moisture) was only 12·5 days. A. A.

SHANNON (Raymond C.). **Observations on** *Anopheles pseudopunctipennis* **in Peru.**—*Amer. Jl. Hyg.* 1930. Sept. Vol. 12. No. 2. pp. 442–448. [15 refs.]

Observations of *Anopheles pseudopunctipennis*, chiefly in the Rimac Valley in Peru. It is the only species that occurs there, and, probably, on the entire western slopes of the Andes. It has been found at an elevation of 7,800 feet. It is also abundant, in July, in one region on the eastern side. [It is known to be a highly efficient carrier of malaria in N.W. Argentina, and a carrier in Mexico. In N.W. Argentina it does not hibernate; in the lowlands all breeding-places dry up in the dry season, so that it can breed, except possibly in occasional springs, only in the rainy season; in the mountains it is forced to breed in the scanty permanent springs.] A. A.

PEREZ (Manuel). **An Anopheline Survey of the State of Mississippi.**—*Amer. Jl. Hyg.* 1930. May. Vol. 11. No. 3. pp. 696–710. With 4 maps & 3 figs.

This paper gives graphic illustration of the distribution within the State of the 3 local species, *A. quadrimaculatus*, *A. punctipennis*, and *A. crucians*.

A. A.

BONNE (C.). Voortleven van Anopheleslarven in vochtige aarde. [**Survival of Anopheles Larvae in Humid Soil.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1930. Aug. 1. Vol. 70. No. 8. p. 804.

In connexion with the observation of KAISER (see this *Bulletin*, Vol. 27, p. 904) on Anopheles larvae in an intermittent swamp, Bonne remarks that he saw a similar condition in Panama.

W. J. Bais.

WELLS (Clifford W.). **The Identification of the Anopheline Mosquitoes of Porto Rico.**—*Amer. Jl. Trop. Med.* 1930. July. Vol. 10. No. 4. pp. 243–248. With 5 text figs. [2 refs.]

Describes and figures the features, particularly of the clypeal, antennal, and anterior submedian thoracic hairs, by which the larvae of the Porto Rico species of Anopheles—*albimanus*, *grabhamii*, and *vestitipennis*—may be distinguished *inter se*.

A. A.

DE MEILLON (Botha). *Anopheles funestus* (**Giles**) **in Smoke-Filled Native Huts.**—*Jl. Med. Assoc. South Africa.* 1930. Nov. 22. Vol. 4. No. 22. p. 693. [South African Inst. for Med. Research, Johannesburg.]

Observation of *Anopheles funestus* in native huts reeking with smoke and in huts where a fire had been burning nearly all night and most of the morning.

A. A.

ORLOWA (A. A.) & SCHACHOW (S. D.). Culicidae und Phlebotominae des Bezirkes Kaarry-Kala in Turkmenien. [**Culicidae and Phlebotominae of the Kaarry-Kala District of Turkmenistan.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1930. Nov. Vol. 34. No. 11. pp. 593–608. With 12 text figs. [28 refs.]

An account of the findings in May-September in the southern Turcoman country, about N. lat. 38°. *A. plumbeus* (along with *Aedes pulchritarsis* and *Ae. geniculatus*) in rot-holes, *A. bifurcatus*, *A. maculipennis*, *A. elutus*, *A. superpictus*. *Phlebotomus papatasii*, *P. sergenti* and varr., *P. major*, *P. minutus* and varr., *P. perniciosus*.

A. A.

LLOYD (R. B.). & NAPIER (L. Everard). **The Blood-Meal of Sandflies investigated by Means of Precipitin Antisera.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 347–359. With 3 graphs. [1 ref.]

In these observations, which were maintained for a term of two years and two months, there were tested 909 specimens of *Phlebotomus*

argentipes, 205 of *P. minutus*, and 34 of *P. papatasii*—collected from all sources. Human and bovine blood was detected in 261 *P. argentipes*, in 32 *P. minutus*, and in 4 *P. papatasii*; human blood alone in 25 *P. argentipes*, in 26 *P. minutus*, and in 1 *P. papatasii*; bovine blood alone in 609 *P. argentipes*, in 84 *P. minutus*, and in 29 *P. papatasii*. Precipitin tests were made with powerful highly specific antisera, the action of the antisera (in high dilution) being fully tested on controls. The following is the authors' own summary of results and conclusions :—

"1. The gut contents of sandflies (*Phlebotomus argentipes*) that have at some time during their life fed on human blood gave a positive reaction with anti-human precipitating serum in 88 per cent. of cases. Within the time limits examined it appears to make no difference whether the meal is recent or not; in two flies a positive reaction was obtained eight days after the human feed, a remarkable result in view of the digestion which must have occurred.

"2. *P. argentipes* and *P. papatasii* feed almost exclusively on the blood of cattle or man. *P. minutus* also usually feeds on the blood of cattle or man, but also quite frequently on the blood of other species. *P. minutus* is a more persistent human-blood feeder than *P. argentipes*, and *P. papatasii* feeds on human blood less readily than the other two species.

"3. *There are marked seasonal variations in the feeding habits of the flies. A graph representing the percentage of human feeds shows a rise in the hot weather (April to June) and a second more distinct rise in the autumn; the latter rise can be explained on the ground that the rainy season (July to September), which precedes this rise, provides the most suitable conditions for ensuring longevity in the sandfly.

"4. *No special difference in the feeding habits of flies in different localities was observed.

"5. *Confirmation was obtained of our previous finding that when the blood of cattle and man are both available the flies feed more readily on cattle.

"6. *The percentage of flies containing human blood appears to vary in inverse ratio to the distance of human sleeping quarters from the cattle shed where the flies were caught.

"7. Our observations provide but little evidence in favour of the sandfly theory of kala-azar transmission, except that in nature *P. argentipes* is a persistent human-blood feeder, and that the percentage of flies containing human blood reaches its highest point at the time of the year when the flies are most numerous, viz., in the autumn. These facts are in keeping with the cold weather rise in the kala-azar incidence curve."

A. A.

NAPIER (L. Everard). **The Artificial Feeding of Sandflies.**—*Indian Jl. Med. Res.* 1930. Oct. Vol. 18. No. 2. pp. 699–706. With 2 text figs. & 3 figs. on 1 plate. [2 refs.] [School of Trop. Med. & Hyg., Calcutta.]

About five-sixths of this paper is taken up with a description of an apparatus for artificial feeding of sandflies, of which the essential parts are a device for clamping and a capillary pipette for feeding the fly; but the instructions for making the apparatus and for its successful management in the operations of feeding the insect are too full of minute attention to detail to be treated summarily.

In the artificial feeding experiments, when condensation-fluid from NNN culture tubes of Leishmania was used *alone* for feeding the flies,

* These conclusions refer to *P. argentipes* only.

it was found in the large majority of cases that development of flagellates did not result ; but that when washed red blood corpuscles were added to the condensation-fluid development occurred. Thus, of 25 *Phlebotomus argentipes* dissected 48 hours or more after an initial feed of fluid from cultures of *L. donovani* only 1 contained flagellates, whereas of 73 fed on the culture-fluid *plus* washed red corpuscles 47 became infected—both male and female insects. Again, of 12 *P. argentipes* fed only on culture-fluid of *L. tropica* none contained flagellates, whereas of 27 fed on the culture fluid *plus* washed red corpuscles 17 became infected. (In the cases of *P. minutus* (=*babu*) and a few *P. papatasii* fed on cultures of *L. donovani* mixed with washed red blood corpuscles no development of flagellates resulted in the flies.)

A. A.

SHORTT (H. E.), SMITH (R. O. A.) & SWAMINATH (C. S.). **The Breeding in Nature of** *Phlebotomus argentipes*, **Ann. & Brun.**—*Bull. Entom. Res.* 1930. Oct. Vol. 21. Pt. 3. pp. 269–271.

The object of this investigation is to acquire the exact knowledge necessary for the location of the breeding-places of the species of Phlebotomus in towns and villages in Assam with a view to despoiling such breeding-places. It is known that the soil fit for the larvae must contain organic debris for food, that it must be loose enough to permit the larvae to burrow freely for their food, and that the site must be sheltered both from casual wetting and from flooding and from desiccation by sun and wind. Such soil and such sites are to be found in Assam on the sheltered sides of the mud plinths of houses and cattle-sheds, in the corners of rooms and where the walls meet the floor, and in heaps of organic debris, old bricks, piled logs, and miscellaneous rubbish lying round about habitations. The soil and dust in suspicious places of this kind must be carefully investigated and searched for larvae and pupae (the eggs being too small for detection on this scale). The authors describe how in convenient samples (3 lb.) the suspected soil is well washed in a basin of water and how the suspension is passed repeatedly through sieves (10, 20, 40, 60 meshes to the inch) until nothing is left on the last sieve but a fine deposit, including the fauna in the original soil. This deposit is carefully washed off into a white developing-dish, where the supernatant fluid is syphoned off and replaced by a saturated solution of white sugar. When the deposit has been stirred into the sugar solution the mixture is allowed to settle, and when it settles all insect-larvae, acarines, nematodes, etc., will have been floated to the surface, where Phlebotomus larvae and pupae may be searched for with a hand lens.

A. A.

ADLER (S.), THEODOR (O.) & LOURIE (E. M.). **On Sandflies from Persia and Palestine.**—*Bull. Entom. Res.* 1930. Dec. Vol. 21. Pt. 4. pp. 529–539. With 2 text figs. & 5 figs. on 2 plates. [14 refs.] [Hebrew Univ., Jerusalem.]

The Phlebotomi were collected between May 27th and July 3rd in the northwest corner of Persia, in towns along the motor-route Khanikin–Kermanshah–Teheran–Kazvin–Enzeli, the Teheran and Kazvin

district being the heaviest centre of cutaneous leishmaniasis, human and canine, in Persia. The species are *P. papatasii*, *P. sergenti* of Parrot, *P. caucasicus* of Marzinovski, *P. chinensis*, *P. kandelaki*, *P. perniciosus* var. *tobbi*, *P. wenyoni*, and *P. tiberiadis*, the last two species and the preceding variety being "new" and *P. chinensis* being the first record from Persia. Attention is drawn to "the quite distinct and well-defined hours of activity of the different species." *P. perniciosus* var. *tobbi* is stated to have been infected by feeding on cultures of *Leishmania donovani* of Mediterranean origin, and *P. caucasicus* by feeding on cultures of *L. tropica*. Some species of Phlebotomus can be bred even on long motor journeys, in earthenware vessels. The vessel containing the insects is closed with muslin over which a lid is tied; the vessel is then buried in a wooden box filled with moist earth; some shafts are then sunk in the earth almost to the bottom of the box (to receive water as required). Or, the earthenware vessel may be simply wrapped in cottonwool or lint kept slightly moist. If any eggs are found when the vessels are examined from time to time, some earth and rabbit-dung can be put in the vessel.

A. A.

PARROT (L.). Notes sur les phlébotomes. III. 1. Sur *Phlebotomus sogdianus* n. sp. 2. Morphologie et répartition géographique de *Phlebotomus parroti* Adler et Theodor. 3. Présence de *Phlebotomus sergenti* dans le Sahara central. [**Notes on Phlebotomus. III. 1. *Phlebotomus sogdianus* n. sp. 2. Morphology and Distribution of *Phlebotomus parroti* Adler & Theodor. 3. Presence of *Phlebotomus sergenti* in Central Sahara.**]—*Arch. Inst. Pasteur d'Algérie*. 1929. Sept.–Dec. Vol. 7. No. 3–4. pp. 303–309. With 3 text figs. [10 refs.] [Pasteur Inst. of Algeria, Algiers.]

1. Having had an opportunity of examining the pharynx and spermatheca of the Phlebotomus described by him in 1928 as *Phlebotomus minutus* var. *sogdianus*, from Bokhara, Parrot now considers it to be a new species; the structures in question are now figured. 2. A distinctive detail in the form of the penis of the N. African *P. parroti* is described and figured. 3. The specific diagnosis of *P. sergenti* of Parrot (now reported from the central Sahara) is confirmed.

A. A.

SINTON (J. A.). **Some New Species and Records of *Phlebotomus* from Africa.**—*Indian Jl. Med. Res.* 1930. July. Vol. 18. No. 1. pp. 171–193. With 48 figs. on 5 plates. [73 refs.]

This paper contains a useful list of the species of Phlebotomus recorded from Africa, with detail of the known geographical range of each. It also contains descriptions and anatomical illustrations, and along with them in each instance a brief differential diagnosis, of the three following species determined by the author to be new to knowledge: (1) *P. symesi* male and female represented by 3 males and 13 females, from Mombasa. (2) *P. yusafi* male and female, represented by 1 male and 2 females, also from Mombasa. (3) *P. freetownensis*, represented by a single female from Sierra Leone. The author makes mention of about 50 specimens of a species from Mauritius (collected by Major W. F. M. LOUGHNAN, *M.C.*) found on close examination to be identical with *P. babu*, a common Indian species.

A. A.

REVIEWS AND NOTICES.

LAING (Frederick). **The Cockroach : its Life-History and how to deal with It.**—*British Museum* (*Natural History*) *Economic Series No. 12.* 2nd Edition. 23 pp. With 3 figs. on 1 plate and 4 text figs. 1930. London : Printed by Order of the Trustees of the British Museum. [6d.]

The first edition of this little book of the cockroach was noticed in this *Bulletin*, Vol. 19, p. 899. Here after eight years we meet the cockroaches again—the Common cockroach (*Blatta orientalis*), the little German cockroach (*Blatella germanica*), the large American cockroach (*Periplaneta americana*), and the Australian cockroach (*P. australasiae*)—and are glad that we do not find any new species or varieties among them. In the last three species the colour is not dark brown and the adults in *both* sexes have fully developed wings, and wing-cases that completely cover the abdomen ; but in *B. orientalis* the colour is very dark brown (hence the household name " blackbeetle "), the wing-cases in the male do not cover the abdomen entirely, and the wings of the female are almost rudiments. The small changes in the present edition are largely of academic interest and relate to such matters as the span of adult life, the exact duration of post-embryonic development, the effects of a laboratory diet, etc.—matters of minor concern to those whose chief business with these disgusting yet interesting insects is either to banish them from our storerooms and culinaria, or to tap them for their wealth of intestinal protozoa. We may notice with satisfaction that the span of life of *B. orientalis* has been shortened by laboratory observations ; at a summer temperature (73° F.) the normal term of the egg-stage is said to be from 2 to 3 months, and of the whole post-embryonic development 9 months to about a year ; but at lower temperatures development would be expected to be slower. *B. orientalis* produces a large number of egg-packets, with an average of about 16 eggs in each. *B. germanica* has 28 to 56 eggs in a packet, and some authorities say that the mother dies after depositing one packet, others say that she deposits at least two, and she is said to have some affection for her progeny ; the growth of this species is comparatively quick—68 to 94 days from hatching to adult at a temperature about 73° F. The American coackroach, which is about 1½ inches long, is particularly associated with ships and warehouses ; its average production of egg-packets is about 25, each holding 14 to 28 eggs ; the normal life of the adult female is from one to two years, of the adult male considerably less. The Australian cockroach is distinguished by the yellow ring on the first thoracic segment and the yellow streak on the side of the wing-cases ; it is said to have not established itself in the dwelling-house.

To extirpate the cockroach many methods are given. Of *Powders*, a mixture of 3 parts sodium fluoride and 1 part pyrethrum, which must not be allowed to get on *our* food ; or of borax and sugar ; or of Plaster of Paris 1 part and sugar 2 parts. *Pastes* of phosphorus or of red lead, spread on paper or on card, are good if they can be used with perfect safety to other animals. Of *Sprays*, a (decanted) infusion made by soaking ½ lb. of pyrethrum powder in a gallon of paraffin, or Carbon tetrachloride may be used as a spray. Of *Traps* and baits much is said ; their success depends upon the bait ; " many of the traps on the market are good " ; greasy or sticky preparations spread on card and baited also are mentioned. *Fumigation* with SO_2, CS_2, and HCN, and the resort to heat in buildings where steam is fitted and the general temperature can be kept for some little time at 130° F. are major operations. The booklet is very nicely illustrated and is in truth a valuable sixpennyworth.

A. Alcock.